



THE RESOURCE FOR INFORMATION EXECUTIVES

WIRELESS
How Bechtel
Is Using It to
Close Bigger
Deals Faster
Page 68

**PROJECT
MANAGEMENT**
Why London's
Traffic Reduction
Scheme Worked
Page 54

**DEMAND
FORECASTING**
The Truth? It Takes
More Than Software
to Predict the Future
Page 46

HOW LEVI'S GOT ITS JEANS INTO WAL-MART

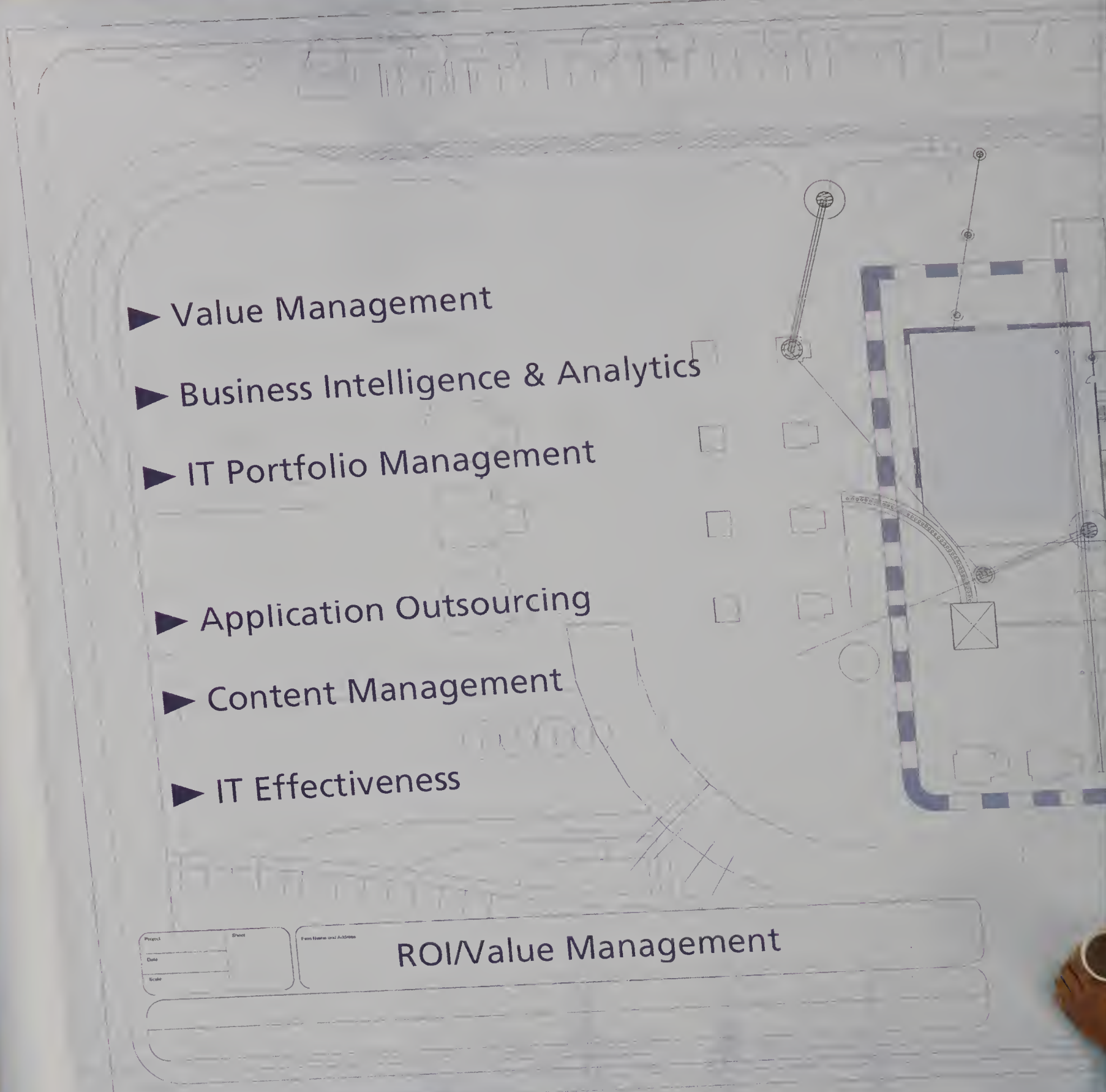
All It Took Was

- * A Transformed Supply Chain
- * Scaled-Up Distribution
- * Real-Time Market Analysis

Page 40

WINNER
**2003 GRAND
NEAL AWARD**
EDITORIAL EXCELLENCE
Jesse H. Neal
National Business
Journalism
Awards

Levi Strauss CIO David Bergen
had to figure out how to keep 3,422
Wal-Marts stocked and happy.

- 
- ▶ Value Management
 - ▶ Business Intelligence & Analytics
 - ▶ IT Portfolio Management
 - ▶ Application Outsourcing
 - ▶ Content Management
 - ▶ IT Effectiveness

Project	Client
Date	
Scale	

Firm Name and Address

ROI/Value Management

BUILD MORE BUSINESS VALUE INTO YOUR IT INVESTMENTS

With mounting profit pressures and demands for cost control, every investment must produce rapid and predictable business value. As the world's third largest IT company, Fujitsu can show you how to improve your return on IT. Our experienced consultants will align your technology with your business strategy for improved performance. And our enterprise value management, application outsourcing and IT effectiveness experience can help maximize the value from IT while reducing total IT costs up to 30% in three years. Along with the right blueprint, a solid infrastructure forms the foundation for business effectiveness. By eliminating "server sprawl," our exceptionally reliable and scalable UNIX servers will lower TCO and improve productivity. For free white papers showing how to maximize your Return On IT, visit us.fujitsu.com/ROIT. Working together, we can accomplish anything.

- 
- ▶ IT Infrastructure Solutions
 - ▶ High-Availability Servers
 - ▶ Mission Critical Managed Services
 - ▶ Resource Optimization Solutions

FUJITSU

THE POSSIBILITIES ARE INFINITE

us.fujitsu.com

{ For those of you who need a little help convincing your C.E.O. that
BEA is the right choice for your business, please use this handy form. }



Dear _____
(YOUR C.E.O.)

**I recommend that we use the
BEA WebLogic® Enterprise Platform
for all future software integration.**

**While you may not have heard of
BEA, they offer the only platform
that is both strong enough to
handle our mission-critical projects
and is easier to use. I acknowledge
that I am accountable for my
actions, and am fully prepared to
take the fall for this decision.**

**But when this works, you owe
me big.**

Sincerely,

**_____
(YOU)**

Cover Story

SUPPLY CHAIN PARTNERSHIPS | 40

How Levi's Got Its Jeans into Wal-Mart

CIO David Bergen joined Levi Strauss almost three years ago with a mission: Get ready for the number-one retailer. This summer will tell if his company's IT transformation will help turn around this American icon. *By Kim Girard*

COVER PHOTO BY ANGIE WYANT



"The changes to support Wal-Mart are extensive," says Levi's CIO David Bergen, who's waist deep in an IT turnaround. "If I look overconfident, I'm not. I'm very nervous about this change."

Features

DEMAND FORECASTING

Future Results Not Guaranteed | 46

Contrary to what vendors tell you, computer systems alone are incapable of producing accurate forecasts. *By Ben Worthen*



"Demand forecasting sounds scientific," says **Sumantra Sengupta**, CIO of lawn and garden company Scotts. "But I would say that if you looked at the split between people, science and process, people are half the equation."

PROJECT MANAGEMENT

How IT Fixed London's Traffic Woes | 54

In a nation known for spectacular IT failures, a new traffic reduction scheme has gained global attention for its smashing success. The secret? Strong project management applied to well-designed systems. *By Malcolm Wheatley*

Q&A | W. BRIAN ARTHUR

IT Reloaded | 62

Economist W. Brian Arthur says technology will jump-start the economy by connecting systems, processes and functions within and among companies. But it's up to the CIO to channel these connections into new functionality that will transform their industries.

MORE ►►►

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

FIRE
ALARM

MORE SECURITY DOESN'T MAKE YOU MORE SECURE. BETTER MANAGEMENT DOES.

The secret to a secure enterprise lies in not just monitoring the parts, but managing it as a whole. That's exactly what *eTrust*™ lets you do. In fact, our *eTrust*™ Security Command Center is the perfect solution to security information overload. It gives you the big picture from a single vantage point, with all your event information prioritized. So you can identify actual internal and external threats before they can wreak havoc. Anything less would be, well, alarming. For more information on security management, go to ca.com/etrust/management.

eTrust™

ACCESS • THREAT • IDENTITY
SECURITY MANAGEMENT SOFTWARE



Computer Associates®

Columns

TOTAL LEADERSHIP You Know Where You Want to Go | 30

The simple path to leadership.

By Christopher Hoenig

MAKING I.T. WORK Squeeze Now, Pay Later | 34

A wounded vendor may turn around and bite the CIO who squeezes it too hard.

By Michael Schrage

Sections

TRENDLINES | 18

The FBI's CIO retires; IBM on the weather desk; Norfolk's plan to fight terrorism; The art of search engines. *And more*

WASHINGTON WATCH | 22

Court opinion raises questions about honeypots.

OFF THE SHELF | 26

Living, Leading, and the American Dream; Why CEOs Fail: The 11 Behaviors That Can Derail Your Climb to the Top—and How to Manage Them; CIO Best-Sellers

EMERGING TECHNOLOGY | 68

Building on Air

PDAs and a wireless infrastructure have made accessing time-sensitive information and mission-critical applications much easier for Bechtel Enterprises' deal makers. But in spite of Bechtel's dramatic cost savings, this kind of wireless deployment won't work for every company.

By Meridith Levinson



EMERGING TECHNOLOGY | 68

Bechtel uses wireless technology to gain competitive advantage.

By Meridith Levinson

UNDER DEVELOPMENT | 74

Newly developed sensors could boost hard drive capacity without also driving up price.

In Every Issue

FROM THE EDITOR CIOs and CXOs: Still Panels Apart | 12

CIOs want more patience while CXOs want more measurements; both need more understanding. *By Rick Pastore*

INDEX | 78

EXECUTIVE SUMMARY | 80

Abstracts of all the feature stories found in this issue.



"It defies human nature to believe that a vendor that has capitulated to all of the buyer's demands won't be on the lookout for ways to make its money back."

—Michael Schrage, CIO columnist, on squeezing vendors Page 34



MAY WE SUGGEST OUR NEW ENTERPRISE REPORTING SOLUTION INSTEAD?

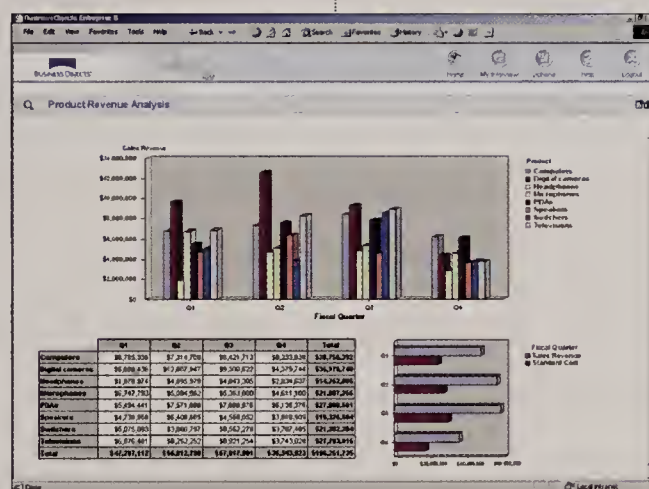


BUSINESS INTELLIGENCE *from* BUSINESS OBJECTS

Looking for real insight into your business? Get out from behind that stack of paper. And get in front of BusinessObjects™ Enterprise 6, the new standard in enterprise business intelligence.

It is, very simply, the industry's best web query, reporting, and analysis solution.

With Enterprise 6, users can access and create reports. Sort and filter data. Get instant insight with on-report analysis. Slice and dice data virtually any way they choose. Quickly and easily turning raw data into actionable information.



There is no more intelligent way to track, understand, and manage your enterprise. Every day, more than 17,500 companies rely on award-winning Business Objects business intelligence software to

unlock the power of information to improve enterprise performance. Perhaps you should, too.

To get started, visit www.businessobjects.com/reporting and take a look at our BusinessObjects Enterprise 6 interactive product demonstration or download our technical white paper. And see what some real insight can do for you.

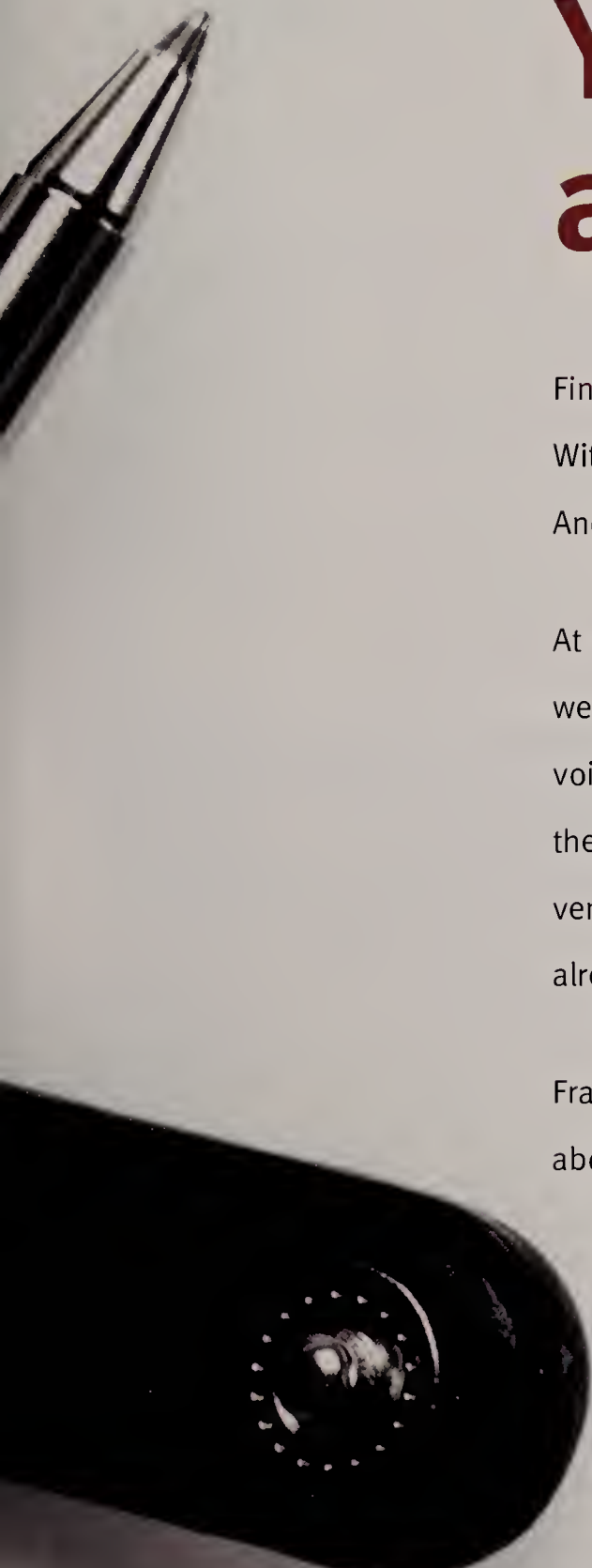


BUSINESS OBJECTS®

TO DO:

- ~~① MANAGE NETWORKS~~
- ② INCREASE IT VALUE

NEXT IRADONE

A black pencil and a black eraser are positioned on the left side of the page. The pencil is at the top, pointing towards the headline, and the eraser is at the bottom, partially visible.

Your priorities are clear now.

Finally, you won't be distracted by day-to-day network management issues.

With NextiraOne as your partner, everything about your networks becomes clear.

And your job does too.

At NextiraOne, we bring clarity to your complex communications networks. Whether we're planning, designing, implementing, supporting or managing. Whether it's a voice, data or converged environment. Whether you're in the United States or around the world. No matter what, we provide the expertise, resources, leadership and vendor-independence that ensure world-class networks. In fact, NextiraOne is already working — adding clarity — at almost 500,000 sites worldwide.

Frankly, with us on your side, your job will never be the same. Instead of worrying about the complexities of your network, you can focus on things that are clearly more important. Like getting more for your IT dollar.

www.NextiraOne.com **(888) 398-0547**

INTERACTIVE >features

from July 15 to July 31



David Bergen

ASK THE SOURCE

David Bergen on Supply Chain Renovation

Would Levi's jeans get squeezed out of the mass market? It looked like a sure thing, if not for a technology overhaul to the company's supply chain. Now Levi's future depends on the success of its new systems—and CIO David Bergen (see **How Levi's Got Its Jeans into Wal-Mart**, Page 40). Until July 31, you can ask Bergen about his company's makeover or share your supply chain pain. Go to www.cio.com/ask to get in touch.

SHARE YOUR OPINION

IT Practitioners Will Drive the Economy

That's what economist and author W. Brian Arthur suggests in his interview with *CIO* (see **IT Reloaded**, Page 62). Digital technology doesn't just let us do the same old things cheaper and faster, it enables whole new processes to come into being. But, he says, it's the CIOs who must imagine how that should happen and initiate it themselves. They can't be passive and blame the budget or the folks upstairs. Is that fair? Go to **Add a Comment** at the end of the online version of this story. Find the link at www.cio.com/daily.

LEARN MORE

Honeypots and Sarbanes-Oxley

Honeypots are decoy systems companies set up to trap network intruders (see **Washington Watch: Court Opinion Raises Questions About Honeypots**, Page 22). **Learn More** in **You Can Catch More Spies with Honey** (www.csoonline.com/read/050103/machine.html) in *CIO's* sister publication, *CSO*. And, in the good news department, complying with Sarbanes-Oxley might not be so hard (Page 22). Catch up on the act's details at www.cio.com/newrules.



W. Brian Arthur

Our Daily Web

MONDAY Tech Tact

Technology Editor Christopher Lindquist covers what's coming.

TUESDAY Quick Poll

Vote with your mouse, and see how other IT leaders feel about current events.

WEDNESDAY Metrics

Web Writer Jon Surmacz makes sense of the numbers.

THURSDAY Sound Off

Web Editorial Director Art Jahnke opines on managerial, political and ethical dilemmas.

FRIDAY The Big Picture

Charts and graphs that are worth a thousand words.

EVERY WEEKDAY The News

We synthesize the top IT news stories of the day.

More Resources Online

Future Results Not Guaranteed, Page 46: Read retailers' forecasting technology experiences in "They Know What You'll Buy Next Summer (They Hope)" and "Toy Story."

IT Reloaded, Page 62: Check out W. Brian Arthur's biography, selected articles and research papers, plus his January 2003 predictions of the impending IT buildout, "Never Mind the Crash, Here Comes the Buildout."

How IT Fixed London's Traffic Woes, Page 54: For more about municipal IT, see "Her Majesty's Flying IT Circus," "The Money Pit" and "Big D, Little IT." **Find these links at www.cio.com/daily.**

Find links to the stories mentioned on this page at www.cio.com/daily.

The

**“GOOD MORNING
YOUR WAIT
IS OVER”**

storage software company.

We've always made your applications reliable. Now we make them faster, too.
VERITAS acquired Precise Software, the leader in application performance.

veritas.com


VERITAS™

© 2003 VERITAS Software Corporation. All rights reserved. VERITAS and the VERITAS Logo Reg. U.S. Pat. & Tm. Off.

From the Editor



If alignment with the CEO is an issue you're wrestling with, go to our CIO Executive Research Center at www.cio.com/executive and click on Executive Issues for strategies and resources.

CIOs and CXOs: Still Panels Apart

I RECENTLY HAD THE UNUSUAL opportunity to moderate two panels of executives from the mutual fund and brokerage industry—one was made up of CIOs; the other was CXOs, including presidents and chief administrative officers. The panels were segregated and held on two different days of the conference. There were industry heavyweights on both panels, representing companies such as Fidelity, Merrill Lynch, Prudential and Sun Life. I asked both groups similar questions to reveal their respective points of view. I also asked each group in advance of the conference what it needed and expected from the other. This is where things got interesting.

The CIOs told me, among other things, that they'd appreciate more patience and commitment from their CXOs.

The CXO panelists reacted cynically when I told them what the CIOs had said. "When an IT professional asks for patience, that usually means it's going to cost more money," quipped one CXO. Perhaps. But it may also mean that you can't expect a payoff in three to six months from a complex enterprise system that involves new processes. Or perhaps it means that you can't successfully align IT to a business "strategy" that shifts from quarter to quarter, buffeted by the cold winds

that are whistling down Wall Street right now.

For their part, the CXO panelists told me to ask if the CIO panelists could answer these two questions: How do you measure your success, and Do you have enough knowledge of the business to run another part of the company besides IT? The CIOs had plenty to say about the first question. They measure things six ways to Sunday—ROI analyses, post-implementation audits, net present value. They are rife with measures. But you know what? If CXOs have to ask the CIO to measure his own success, what does that say about the CXOs? Could it be that they haven't got a clue to what's going on? Maybe they simply haven't taken the time, as one CIO panelist put it, "to understand their technology costs and how IT fits into the business strategy, rather than relegating that to the technologists." How would the CXOs answer their own challenge in reverse: Do you have enough understanding of technology to run the IT department?

This all was a bit discouraging. But one CIO panel member partly redeemed the experience. When asked what he needs, wants or expects from C-level execs, this CTO responded: "They should have tremendously high expectations of their CTOs and other IT leaders." Would that were always the case.

Rick Pastore

Rick Pastore, Deputy Editor
pastore@cio.com

A man with short, light-colored hair, wearing a white long-sleeved shirt and a dark tie with a light-colored pattern. He has his arms crossed and is looking towards the camera with a slight smile. The background is a plain, light color.

Amdocs

No more
CRM promises.
Just real-time
results.

**Amdocs ClarifyCRM.
Results in real time. And we can prove it.**

Results for your employees. Results for your customers. Results for your company. When they matter—in real time, at the point of customer interaction. Now your employees can view just one screen and get all the customer information they need to take action, solve problems, and to sell more. Your customers get better service. Your company gets higher customer value, at lower costs. We've completed more than 1,000 successful CRM implementations for major corporations worldwide. Results are our commitment. Learn how we can do the same for you: Visit us at www.amdocs.com/clarifycrm12



The Resource for Information Executives

President Walter Manninen

Publisher Gary J. Beach

Editorial Director Lew McCreary

EDITORIAL

Editor in Chief Abbie Lundberg

Deputy Editor Richard Pastore

Managing Editor David Rosenbaum

Managing Editor, Production Cheryl R. Asselin

Executive Editors Alison Bass, Michael Goldberg, Christopher Koch (Investigations)

Leadership and Management Editor Edward Prewitt,

Opinion and Knowledge Management Editor Megan

Santosus, **Research Editor** Lorraine Cosgrove Ware,

Special Projects Editor Mindy Blodgett, **Technology Editor** Christopher Lindquist

Senior Editors Scott Berinato, Todd Datz, Alice Dragoon, Elana Varon (B2B E-Commerce)

Features Editor Lafe Low

Senior Writers Meridith Levinson (B2C E-Commerce), Stephanie Overby, Sarah D. Scalet (Security and Privacy)

Staff Writer Ben Worthen

Copy Chief Tom Wailgum

Asst. Managing Editor, Production Kathleen S. Carr

Copy Editors Kelli A. Gauthier (Assoc.), Emily S. Henderson, Sarah Johnson (Assoc.)

Special Projects Manager Lynne Z. Rigolini

Editorial Resource Manager Carol Zarrow

Editorial Assistants Daniel J. Horgan, Joe Sullivan

Contributors John Edwards, Kim Girard, Grant Gross, Christopher Hoenig, Robert McMillan, Michael Schrage, Malcolm Wheatley

Editorial Operations Specialist Julie Hanson

DESIGN

Executive Director, Art and Design Mary Lester

Art Directors Hana Barker, Terri Haas, Lisa Munroe

Associate Art Director Owen Edwards

Senior Designers Kaajal S. Asher, George Lee

Designer Alberto Capolino

Design Operations Specialist Rachel Barnett

ONLINE EDITORIAL

Web Editorial Director Art Jahnke

Consulting Editor Janice Brand

Web Editor Sandy Kendall

Web Writer Jon Surmacz

ONLINE & INFORMATION SYSTEMS

Chief Information Officer Mark Hall

Online

Senior VP/General Manager, Online Tim Horgan

Director, CIO Best Practice Exchange Martha Heller

Senior Editor, CIO Best Practice Exchange Sari Kalin

Operations Asst., CIO Best Practice Exchange Lisa Byron

Online Technology Director Dagmar Eiben

Senior Web Developer Ellen Morey

Director of Online Research Kathleen Kotwica

E-Commerce Manager Andrew Burrell

Web Developers Diane Chen, Shannon Macdonald

Online Content Researcher Tara Gillet-Liloia

Designer Graham White

Information Systems

Infrastructure Manager James C. Burgoyne

User Services Manager Ron Bettencourt

Senior User Services Specialists Jonathan Frappier, Michael Fahlsing

System Administrator Robert Reagan

CIRCULATION

Senior VP/Circulation Carol A. Spach

Circulation Director Faith Marcello

Subscription Svcs. Supervisor Tina Pescara

PRODUCTION

VP/Manufacturing Chris Cuoco

Production Manager Lee Tuttle

Senior Production Coordinator Lisa Stevenson

EXECUTIVE PROGRAMS

EP Senior Vice President Jennifer Richards

Conference Management Vice President Cynthia Mollus

Marketing Services Director Shellie Rapson James

Business Development VP John Amato

Program Operations Manager Brian Fuce

Marketing Manager Glede Kabongo

Marketing Services Coordinator Andrea Slobogan

Event Development Specialist Sandra J. Hughey

Operations Coordinator Michael Barbato

Event Planning Manager Amy Turell

Senior Customer Services Coordinator Sarah Yee

MARKETING

Executive VP/Marketing Cathy O'Leary Hayes

VP/News and Information Susan Watson

Media Relations Manager Karen Fogerty

News and Information Associate Lori Piscatelli

Marketing Research Director Bridget Cammarata

Marketing Research Manager Carolyn Johnson

Sr. Marketing Research Analyst Dylan DiGregorio

Marketing Comm. Director Sue Yanovitch

Sr. MarCom Development Specialist Kari Curto

Marketing Comm. Associate Sarah Crowley

ADMINISTRATION

Manager of Finance Margarita Chiango

Finance and Operations Analyst Chris Bernardi

Executive Assistant to the President Diane Martin

Billing Administrator Joyce Gillis

Facilities Specialist John Kelley

Office Services Coordinator Mary E. Wooldridge

HUMAN RESOURCES

Human Resources Vice President Patricia Chisholm

Human Resources Manager Tanya Bureau

Human Resources Representative Beth S. Ramistella

FOUNDER

Joseph L. Levy



CXO MEDIA INC.

INTERNATIONAL DATA GROUP

CEO Pat Kenealy

Board Chairman Patrick J. McGovern



© CXO Media Inc.

How to Reach Us

E-mail letters@cio.com

Phone 508 872-0080

Fax 508 879-7784

Address CIO Magazine, CXO Media Inc.,
492 Old Connecticut Path, P.O. Box 9208,
Framingham, MA 01701-9208

Website www.cio.com

Topic Experts www.cio.com/online_beats2.html

Subscriber Services 866 354-1125, Fax 847 564-9453,
E-mail cio@omeda.com

Rights and Permission Andrew Burrell • 508 935-4785,
E-mail aburrell@cxo.com

SONY®

THE TIME TO THINK ABOUT BUYING TAPE STORAGE IS 2006.

Lots of solutions look good today. But where will they be years from now? With the flood of corporate data constantly rising, you need more than a tape storage "roadmap." You need the smartest, best-researched, highest-capacity path to the future. And that's SAIT.

SAIT achieves a whopping 1.3 terabytes of compressed storage. In comparison, SDLT and LTO Ultrium® aren't scheduled to exceed this capacity until 2006, by which time SAIT will have still higher capacity.

Sony paid careful attention to your enterprise storage needs and SAIT delivers. Here's lower cost per gigabyte. Simplified data management. Proven technology. An industry-standard form factor. And a credible roadmap from the world record holder in tape storage density, Sony.

SAIT. Smart today. Brilliant tomorrow.

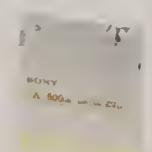
Work Smart. Work Sony.



SAIT PETASITE® LIBRARIES EXTEND
BEYOND TERABYTES INTO PETABYTES



THE SAIT DRIVE FITS EXISTING
ENTERPRISE TAPE LIBRARIES



ONE SAIT CARTRIDGE HOLDS
1.3 TERABYTES COMPRESSED

DOWNLOAD THE ONLINE WHITE PAPER, "SAIT – A TAPE TECHNOLOGY
FOR THE 21ST CENTURY" AT WWW.SAITTAPE.COM

SAITDATASTORAGE

SAITAV

SAITMEDICAL

SAITGOVERNMENT

SAITSECURITY

©2003 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Features and specifications are subject to change without notice. Sony and PetaSite are trademarks of Sony. All other trademarks are property of their respective owners.



I want

affordable
communications:
local, long distance,
and Internet.

I want
our voice
and data services
to be on one
global network.



Together. **From one company.**



Introducing MCI Advantage®, the world's first truly converged voice and data service. It gives your company local and long distance calling with Internet services on one global IP network. Plus easy online account management, voicemail control features, and pay-as-you-go flexibility with a minimal upfront investment. In other words, it's what every CEO and CIO wants. **To get your MCI Advantage now, call 1 888 886 3844 or go to www.mci.com/go/proof**

Local service not available in all areas

trendlines

the **NEW** the **HOT** the **UNEXPECTED**

Edited by Lafe Low and Michael Goldberg

F O L L O W - U P

Why the FBI Didn't Get Its Man

FROM THE GET-GO, Darwin John was an unlikely candidate to overhaul the FBI's antiquated computer systems.

John's style, honed during two decades as a CIO, is introspective, philosophical. The bureau favors men of action. In his mild-mannered fashion, John uses words like "holistic" when talking about conceiving long-term IT plans. The bureau is just what it sounds like—a bureaucracy. (For more about John's taking the FBI CIO job, see "The Unlikeliest G-Man," at www.cio.com/printlinks.)

And so it was on May 14, that the FBI announced that John was retiring. One of FBI Director Robert Mueller's most prominent appointments after September 11, John's mission as CIO was to transform the burdensome bureaucracy into an IT-powered hive of supersleuths. He lasted just 10 months. And the bureau's ambitions for a quick, effective and much-needed modernization have stalled again.

John, former head of IT for the Mormon Church and Scott Paper, has moved back

home to Cottonwood, Utah, but he'll still spend one week a month at FBI headquarters in Washington, D.C.

"I hope it's the best of both worlds, where I will have the opportunity to have input but in a way that works better," says John, 65, who (in his quiet way) expressed frustration that he was forced to spend too much time on the FBI's day-to-day operations and too little time on long-term strategy. "There are a lot of demands on [the bureau's CIO], and gravity pulls you toward the near term. Reflecting on the whole, I think this [consulting role] clearly is freeing in that sense to be able to focus on longer term," he adds.

With the new consulting role, John will spend one-on-one time each month with Mueller and participate in IT strategy meetings.

W. Wilson Lowery, executive assistant director of administration, will serve as interim CIO while the FBI conducts yet another search for a CIO. An ad for the CIO position in 2002

Continued on Page 20



Former FBI CIO
Darwin John

OK, I'm an idiot.

—Phillip J. Windley, Utah's former CIO, apologizing in his Web log on May 21, 2003, for using a security software tool to test the vulnerabilities of Utah.gov, the state's online portal. Utah's service provider blocked Windley's IP address. "I had no idea the tool would be as aggressive as it was," Windley added.



PHOTO LEFT BY KENT MILES. RIGHT BY LANCE CLAYTON

Email

Oracle

42,000 Employees

3 Oracle Email Database Servers

Microsoft

50,000 Employees

110 Microsoft Exchange Servers

Source: Microsoft CIO



REGISTER NOW AND SAVE
September 7-11, 2003
San Francisco, California
oracle.com/oracleworld

**Unless you have as much money as Microsoft,
you may want to use Oracle for email**

ORACLE®

Source for Microsoft Data:
Keynote presentation by Microsoft CIO
at NRFtech IT Leadership Summit on August 12, 2002

**oracle.com/email
or call 1.800.633.0541**

Why the FBI Didn't Get Its Man

Continued from Page 18

cited the need for someone who possessed financial management know-how, leadership skills and the ability to navigate treacherous political waters. A spokesperson for the FBI says that the criteria for the position will not change and that John will help with the new search. "The director was very happy with Darwin. He's just trying to find someone that's compatible with the needs we have here."

John knew he was a challenging fit for the FBI, but then again, this founding figure of the CIO position had been in similar spots. "It's clear that my style is not the predominant style at the bureau," he told *CIO* last winter. "It's probably fair to say that I think about things differently than many do here, but that's probably been true in every setting I've been in."

—Sarah D. Scalet

SUPERCOMPUTERS

IBM on the Weather Desk

IT TURNS OUT that you can outsource the weather.

The National Weather Service (NWS) last month signed a nine-year, \$224 million pact with IBM to perform weather-modeling calculations at a hosted IBM facility.

The work of forecasting hurricanes and other storm systems will now be done on a cluster of 44 eServer p690 servers at IBM's Gaithersburg, Md., hosting center. The cluster is capable of 7.3 trillion calculations per second, or 7.3 Tflops, which would place it in the top 10 on the list of the world's fastest computers, says Dave Turek, vice president of IBM's Deep Computing unit. The weather service deal is the first time that IBM has leased exclusive use of a specific supercomputer system.

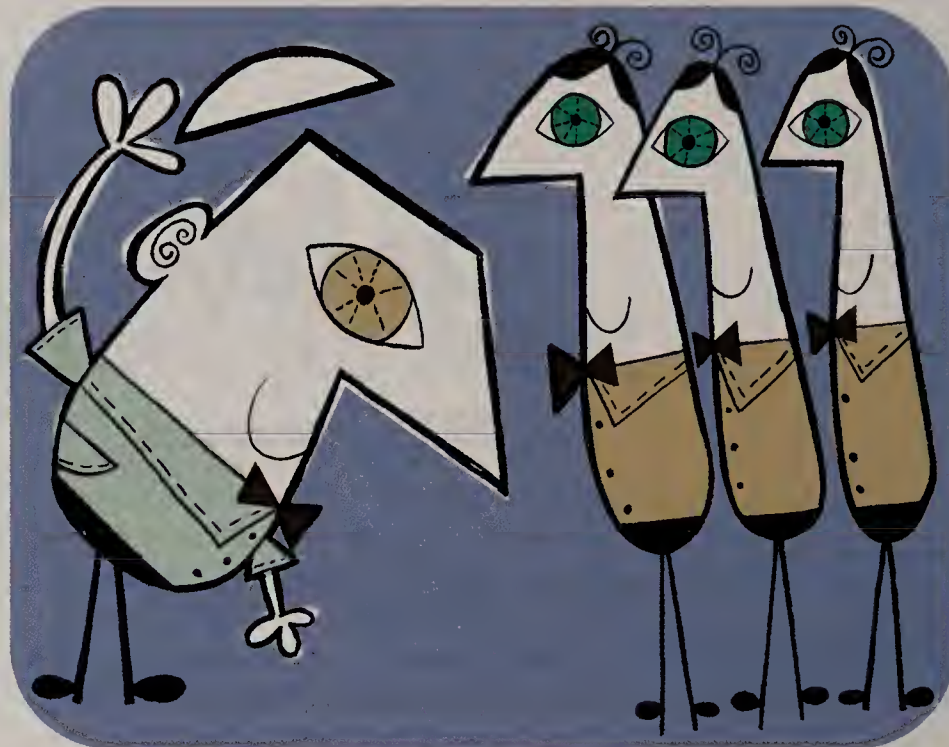
Kevin Cooley, CIO for the weather agency's National Center for Environmental Prediction, says the move to IBM came down to price and performance. "We were able to get broader levels of performance over the life of the contract when the system was in a vendor facility," Cooley says.

IBM will enhance the system's performance throughout the contract. The supercomputer will achieve 48 times the performance of the current system by the time the lease ends in 2012, according to Cooley. The new machine will perform at 100 Tflops by 2009, IBM estimates. That means the NWS will be able to make seven-day forecasts with the same level of accuracy as its current three-to-four-day forecasts, Cooley says.

—Robert McMillan

MANAGEMENT PHILOSOPHY

To Know Them Is to Lead Them



WHEN ROBERT URWILER came on board as the new vice president and CIO of San Francisco-based Macromedia last September, he wanted to get acquainted with his new staff and his peers on the executive team as quickly as possible. He also wanted to save them from the angst of wondering about this new head honcho's persona. "As a new leader, the more quickly you can understand your colleagues and your staff," he says, "the more quickly you can become a productive and efficient leader."

To break the ice, Urwiler shared his Myers-Briggs personality profile with his 105-person IT staff as well as Macromedia's senior management team. He also invited them to take the personality test themselves and share the results with each other. (For more information on Myers-Briggs and its 16 different personality types, see www.personalitypage.com/info.html.)

Even though only a few employees ended up actually sharing their profiles, Urwiler says the exercise was valuable. It gave his colleagues a quick read of his INFJ (quietly forceful, hard-working, individualistic and sensitive) personality and has helped him more effectively manage his staff.

For example, Urwiler learned that his operations director is an ISTJ, which means he is hard-working, among other things. However, Urwiler has to keep an eye on him to ensure that he doesn't take on too much responsibility. "Understanding this fella's personality has helped me manage how much work he does," Urwiler says. "This is something I'd figure out naturally over time, but understanding the profiles helps me be on the lookout."

—Meridith Levinson



Ever need consultants to figure out how much your consultants cost?

Only PeopleSoft Enterprise Service Automation delivers proactive control over outside services spending.

PeopleSoft ESA is the only complete solution for managing the expense of outside contractors, consultants and temps. It enables you to know exactly who's doing what and how much it is costing. And PeopleSoft ESA matches the right skills to the right projects in real time. So you minimize outside services spending, while maximizing its value. Learn more by visiting us at www.peoplesoft.com/realtime or call 1-888-773-8277.

PeopleSoft® | Enterprise Service Automation

Washington Watch

Edited by Elana Varon

PRIVACY

Court Opinion Raises Questions About Honeypots

HONEYPOTS—decoy systems companies set up to trap network intruders—are fast becoming one of the most common and useful information security devices. Easy to deploy, these phony routers or databases can be configured to capture data about anyone trying to access a network illegally. There's only one catch: using honeypots—and possibly any other system that collects IP addresses, file headers or even search terms—may be illegal.

Judge Sandra Lynch, writing for the U.S. First Circuit Court of Appeals, recently ruled on an appeal in a suit by seven private citi-

zens against Pharmatrak and said that information such as URLs and file headers is protected under the 17-year-old Electronic Communications Privacy Act (ECPA)—a federal wiretapping law. Pharmatrak, which analyzes for the pharmaceutical industry how visitors use drug makers' websites, collects URLs and other evidence of online activity. In the process of collecting this data, the company also picks up terms entered into online forms that are rendered in the URL, much like the URL of a Google search results page will contain the search term. The court ruled that any unauthorized interception of this data is a violation of ECPA.

The case, *Blumofe v. Pharmatrak*, was

remanded to the lower court for further action.

The implications of this decision—one of the first to apply the wiretapping law to the Internet—are potentially far reaching, says Orin Kerr, an associate professor at George Washington University Law School. Future litigation is likely to determine whether, say, matching click-stream information to individual users is also illegal. In the meantime, however, there's no doubt honeypots are a legal land mine for companies.

While there's no need to tear down honeypots just yet, it is time to find out how your IT department is using them and come up with a strategy that keeps the new legal precedent in mind. One obvious first step, says Kerr, is to alert all website users—good guys and bad guys—that you are monitoring their activity. “That generates consent,” says Kerr, and makes it harder for a hacker to argue that his privacy was violated.

—Ben Worthen



Judge Sandra Lynch

Find Out More

To learn more about honeypots and the Sarbanes-Oxley Act visit www.cio.com/daily.

cio.com

SARBANES - OXLEY

Final Financial Rules Extend Time to Comply

FINANCIAL-REPORTING rules adopted by the SEC in late May should mean less hassle than expected for CIOs. The final rules for implementing Section 404 of the Sarbanes-Oxley Act, which governs corporate financial systems, give companies nine more months to comply with the law than the SEC originally proposed and appear to offer CIOs more flexibility in how they manage financial data.

Section 404 mandates that CEOs and CFOs provide assessments of the internal controls and financial reporting structures at their companies. By delaying the date that many large companies must begin the new practices until June 15, 2004, the SEC has given most executives until their 2004 annual reports to comply.

CIOs now have extra time to think about technology needed to comply with the reporting requirements, says Lynn Edelson, leader of a Sarbanes-Oxley task force at consultancy PricewaterhouseCoopers.

In addition to the timing, a criticism of the SEC proposal was the lack of specifics, such as what accounting standards the financial reporting should follow. As expected, the final rules lean toward the most widely recognized standard, called COSO, for the Committee of Sponsoring Organizations of the Treadway Commission. But Tom Wardell, a partner specializing in corporate finance with McKenna Long and Aldridge in Atlanta, says some of the final language appears to allow companies to use any framework of controls adopted by any recognized body.

The final rule also appears to back away from forcing companies to create new, large-scale systems for monitoring risks, such as those required by COSO. CIOs won't be stuck with this responsibility as long as the company has a financial reporting process.

—Grant Gross



driving. experience.

What's driving your customers' decisions?
Acxiom's experience helps you know.

Acxiom® gives companies the ability to interact with their customers as part of a meaningful, ongoing relationship. Customers are more than just a name, and CRM is more than just an acronym. It's the way you'll do business. And you'll do it with a partner you can trust.

We provide customer and information management solutions that work. It's what has made us a trusted partner for some of the largest, most respected companies in the world – companies like Nissan North America, Charles Schwab & Co., AT&T, Sprint, Reiman Media Group, Federated Department Stores and Rodale just to name a few.

Are you ready to grow your bottom line by building valuable relationships with your customers? Acxiom is ready for you. Forming a great relationship with us puts you in the driver's seat to experience a great relationship with your customers.



Win a day at the Richard Petty Driving Experience.
Visit www.acxiom.com/petty for more information.

1-888-3ACXIOM

CUSTOMER AND INFORMATION MANAGEMENT SOLUTIONS

TECHNOLOGY/CDI
AbiliTec®

CONSULTING
& ANALYTICS

DATABASE
Solvitur®

IT
OUTSOURCING

DATA
InfoBase®

PRIVACY
LEADERSHIP

ACXIOM®
GREAT RELATIONSHIPSSM

www.acxiom.com

HOMELAND SECURITY

Local Plan to Fight Worldwide Terror

IN THE POST-9/11 FRENZY of federal activity to implement homeland security measures and integrate the activities of national law enforcement, intelligence and border control authorities, one fact may be lost on the average citizen: Terrorist incidents are local.

That fact has not been lost on officials in Norfolk, Va., who recognize that their city of 234,000 residents, located in southeastern Virginia some 200 miles from Washington, D.C., could be a future target. Norfolk boasts the largest naval base in the world and the second-largest shipping-container terminal on the east coast. It is also a major cruise ship port and has a number of tunnels, bridges and causeways.

And since Hap Cluff arrived in Norfolk in January 2002 as the city's IT director, he's led an effort to develop a comprehensive homeland security plan for Norfolk, with technology as a core element. Cluff hopes that the plan, known as The Norfolk Model, will serve as a blueprint for other municipalities.

Rapid Response Points

Hap Cluff, director of IT for Norfolk, Va., is pursuing these initiatives to develop his city's emergency management plan.

***Data-sharing agreements.** Work with public safety and health agencies, hospitals and the Red Cross to set policies for sharing what data, and with whom.

***Secure, high-speed wireless communications.** Cluff is pursuing a partnership with Ricochet Networks to equip first responders with laptops or PDAs.

***Interactive digital television.** All residents would receive free set-top boxes that give analog TVs the ability to accept and send digital signals. The city could broadcast emergency information and give citizens Web access.

***Software for coordinating volunteers.** The city and volunteer organizations, such as the Salvation Army, could match up volunteers with resource needs using software called eCoordinator from Olive Tree Technologies.

***Rapid damage assessment.** Cluff would like to install Accela's Emergency Response System, which makes Norfolk's GIS database available to first responders. In a disaster, inspectors could access the Federal Emergency Management Agency's assessment form, then transmit that information to FEMA via a handheld device.

***Central command center.** Cluff is working with Norfolk State University to securely host the applications supporting its homeland security plan in a new telecommunications center, slated for completion in 2006.

The main goal of the plan is to bring the city's emergency management processes into the digital age. To do that, Cluff needs to bridge the disparate data silos that currently exist among city agencies, public health institutions and nonprofits such as the Red Cross. Currently, Cluff says, "There's a tremendous lack of integration."

INTEGRATION EFFORTS

One avenue he's exploring is partnerships with cutting-edge technology vendors (see "Rapid Response Points," this page). Another integration effort underway is the deployment of a product called e-Work from Metastorm that is designed to help the city automate the 3,000 or so paper forms it uses, and to document the thousands of business processes that now reside in workers' heads. In August, the city will go live with a new \$6 million computer-aided dispatch system that will allow police and fire personnel to communicate wirelessly using laptops.



These projects represent progress. But integrating city agencies with all the other organizations' systems could be a nightmare, Gartner analyst French Caldwell points out in this hypothetical observation: "If you have the Salvation Army keeping data in an Excel spreadsheet and the Navy using an Oracle database and Norfolk using something in between, how do you share that data in a real-time crisis?" There are also other issues that need to be ironed out—such as data security, data access and how Norfolk might integrate with neighboring jurisdictions, state governments and the federal government.

There's also the question of funding. Cluff figures the plan would cost about \$30 million, and the city is in a long line of municipalities that have been begging Washington for federal help that has been slow to come. Cluff is pursuing technologies that can be used in day-to-day operations—not just for emergency management. But he freely admits, "I don't have any money. My goal is that, between partnerships and the feds, we can build this model in such a way that it pays for itself," adding that if Norfolk can show ROI for its technologies, then other cities will be able to justify the costs.

Ron Holifield, communications director at The Innovation Groups, a nonprofit association of municipalities that provides networking and training services, praises Cluff's planning. "It is more far-reaching than the typical city is ever going to attain. But if 100 percent isn't realistic, even if a city moves 20 percent, it will make huge progress," he says.

—Todd Datz



2003 "Best New Technology" Winner*

Are you prepared for the next big application that might be kicked your way?

Introducing

 **CCTP™**
video surveillance for the digital age

Want to know more?

Simply go to anixter.com/CCTP

or call 1-800-ANIXTER.

- 40% of physical security departments now report up through IT. . . and that number is increasing
- Video surveillance technology will be an IP-based platform
- Current video surveillance infrastructure can't handle today's surveillance needs, much less tomorrow's digital applications
- CCTP is 30% less expensive than traditional CCTV systems

CCTP, engineered by Anixter, is a revolutionary UTP-based video surveillance system that allows you to run standard video surveillance systems at a lower cost today while being prepared for the IP-based video surveillance applications of the future.

>>CCTP products exclusively manufactured for Anixter by Belden and Siemon.

*Winner of the "Best New Technology" Award at the Federal Office Systems Expo (FOSE)

Off the Shelf

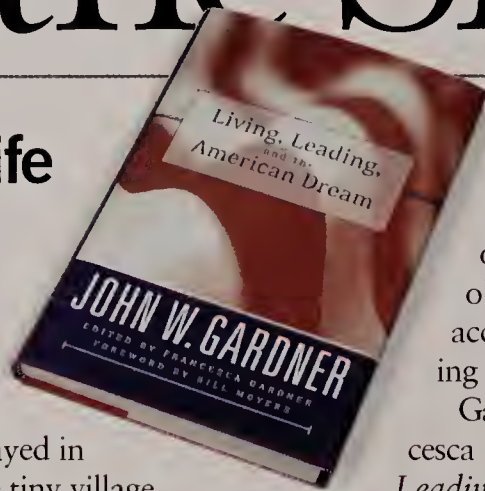
Edited by Carol Zarrow

An American Life

Living, Leading, and the American Dream

By John W. Gardner
Jossey-Bass, 2003, \$25.95

AS A YOUNG CHILD, before World War I, John Gardner played in the lima bean fields around the tiny village of Beverly Hills and watched movies being filmed in its streets. Beverly Hills and the rest of America were on the verge of being changed forever, and Gardner grew up and worked at the epicenter of those changes. While he is best known as the founder of the citizen advocacy group Common Cause, he held positions in every sector of the U.S. economy: military, corporate, government, nonprofit and education. Before his death in 2002 at age 89, he had returned to Stanford University (from which he graduated in the middle of the Great Depression with a degree in psychology) to teach business school students about leadership and organizational renewal. A prolific thinker and writer, he focused on civic and personal dichotomies such as society and the indi-



vidual; self-fulfillment and service to others; freedom and obligation; power and accountability; and leading and following.

Gardner's daughter Francesca has assembled *Living, Leading, and the American Dream* out of excerpts from her father's journals, magazine articles, speeches and books. The gathered excerpts are grouped into five themed sections: her father's autobiographical pieces, and his writings on individual fulfillment, the individual and society, the nature of leadership, and present-day challenges. The resulting patchwork is both this book's strength and its weakness. Although it's a comprehensive overview of Gardner's writings, *Living, Leading, and the American Dream* is also dense and occasionally repetitive. Readers will probably find it best taken in small sips, not one giant guzzle. For those interested in reading the works of this unique and passionate thinker in their original forms, the book includes a bibliography of its sources. —Carol Zarrow

CIO Best-Seller List

5 Now, Discover Your Strengths: The Revolutionary Program That Shows You How to Develop Your Unique Talents and Strengths—And Those of the People You Manage

By Marcus Buckingham and Donald O. Clifton
The Free Press, 2001

4 Execution: The Discipline of Getting Things Done

By Larry Bossidy and Ram Charan
Crown Publishing Group, 2002

3 Fish! A Remarkable Way to Boost Morale and Improve Results

By Stephen C. Lundin, Harry Paul and John Christensen
Hyperion, 2000

2 Leadership

By Rudolph W. Giuliani
Miramax Books, 2002

1 Good to Great: Why Some Companies Make the Leap...and Others Don't

By Jim Collins
HarperCollins Publishers, 2001

SOURCE: DATA FROM THE WEEK OF JUNE 9, 2003.
COMPILED BY BORDERS GROUP, ANN ARBOR, MICH

CEOs Behaving Badly

Why CEOs Fail: The 11 Behaviors That Can Derail Your Climb to the Top—and How to Manage Them

By David L. Dotlich and Peter C. Cairo
Jossey-Bass, 2003, \$22.95

THERE ARE 11 BEHAVIORS that can not only impede an executive's rise to the top but can also cause considerable collateral damage to his organization. In *Why CEOs Fail*, executive coaches David Dotlich and Peter Cairo dedicate a

chapter to an in-depth discussion of each behavior. Readers won't be surprised to see arrogance, aloofness and excessive caution on the list, but melodrama, mischievousness, eccentricity and passive resistance? It's doubtful these would be viewed as career-derailers around most offices, much less a threat to any company.

The book doesn't just describe these 11 bad behaviors, however. Included in each chapter is a self-assessment quiz to help readers diagnose their own weaknesses and manage around them. Here Dotlich and Cairo draw on the research of psychologist Robert Hogan and leadership authorities Ram Charan and Daniel Goleman. The authors are careful to point out that exhibiting one or even several of these derailing behaviors need not be an inevitable career

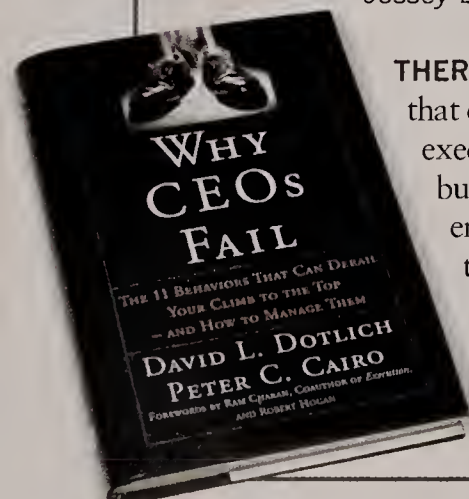
killer. Flawed human beings can still be great leaders. (They allude to a well-known, successful CEO who has all 11 behaviors.) The key to managing any personality trait, they contend, is to recognize it, learn in which situations it most frequently manifests itself and take preventive measures. This book can enlighten both CEOs and the people who have to work with them.

—Megan Santosus

Read More About Reading

For more good reads, visit the **READING ROOM** at www.cio.com/books and also visit the **BOOK ROOM** at www.darwinmag.com/connect/books.

CIO.com





***"I've got a flat tire on the expressway.
Start dinner without me."***



***"Fiber cut at Westin facility.
Redirect routing to backup facilities."***

Every message is important. But some are essential. When your message is mission critical, there's SkyTel. Unlike the hit-and-miss world of cell phones, with SkyTel, message delivery is guaranteed. For information regarding the high reliability of SkyTel messaging, visit skytel.com/go or call 1.800.792.2238. Assuming, of course, that your cell phone is in the right coverage area.

SKYTEL

OFFSHORE OUTSOURCING

When the Customer Isn't Right



John Doucette

INDIAN I.T. VENDORS have an unmatched commitment to customer service. "It's absolutely their competitive advantage," says John Doucette, vice president and CIO of United Technologies, which contracts with five companies in India.

But that positive can turn to a negative, which Doucette found out when he worked with Wipro Technologies while CIO of Otis Elevator (1998-2000), a United Technologies subsidiary. (For more on Doucette's experience, see "Inside Outsourcing in India" at www.cio.com/printlinks.)

Once, Doucette recalls, his company gave Wipro the requirements and specifications for an e-commerce system. The system returned to him as requested—on time, on budget. But his request, it turns out, was flawed. The system didn't work as envisioned.

"They knew it wasn't what we wanted, but they were so determined to please us that they did exactly what we said," he says. Doucette had to visit the offshore workers and explain to them that they should speak up if the company asks them to do something

they don't think is right.

The talks helped. "Now they take our requirements and say, We think you should do it this way. And they have some really great ideas," Doucette says. "They're getting to where they understand a lot of best practices, whether its Web development or ERP."

This story is a symbol of the growing sophistication of companies like Wipro, which now must compete with the likes of IBM Global Services and Accenture. "We have excelled at giving the customer what he wants. We now need our people to become consultants who not only know better but also are unafraid to say so," says Vivek Paul, president of Bangalore-based Wipro.

Paul says Wipro is acquiring these new skills both by acquiring U.S.-based companies (like NerveWire in April) and by investing in training programs so that 2,200 Indian employees can develop leadership thinking and communication skills by early next year.

Doucette hopes the culture change doesn't go too far, adding, "I wish our domestic contractors understood the customer-focused nature of the Indian people."

—Stephanie Overby

SEARCH ENGINES

The Art of Being Found

WHEN WILL AUBUCHON types a gardening term into Google, money's riding on the results. Aubuchon is the website manager for Aubuchon Hardware, his family's chain of stores located in New England and New York. Last year, the 25-year-old rebuilt Aubuchon's Web store with the help of IProspect, one player in the growing field of search engine optimization services. The goal is to get Web searches to place Aubuchon's gear high on their search-results lists.

Getting there takes some doing. Last year's relaunch involved four major steps, says Brian Kaminski, client services manager at IProspect: Organizing 40,000 products into 13 categories relating to popular key words, creating subsections of the site like Lawn-and-garden.aubuchonhardware.com, writing descriptions for each product, and feeding all that information to Google. All that doesn't come cheap—a typical IProspect engagement costs between \$12,500 to \$40,000 per month for a one-year contract.

So far, Aubuchon's results are mixed. Google searches for items like wheelbar-

rows and lawn fertilizer fail to find Aubuchon, but enter "garden weasel" and bingo—Aubuchon is in the top three listings. "The more general terms aren't my priority now," Aubuchon says. "The people that are really making sales for us know what they want already." The privately held company won't reveal numbers, but this year the Web store will take in more revenue than the 95-year-old chain's largest outlet. (Aubuchon uses DoItBest to fulfill its online orders.)

Catering to search engines' tendencies has been going on "almost since we've had them," says Danny Sullivan, editor of SearchEngineWatch.com. During the past two years, he says search engines have offered more chances to buy paid listings, which get about 2 percent or 3 percent of surfers to click on them. Aubuchon used to rely on Overture's pay-per-click service to bid on keywords that show up in the "paid advertising" column on Google after a search.

The free links on search results are 5 per-

cent to 10 percent more likely to get click-throughs. "It's really the words on your page that will help your site get listed," says consultant Jill Whalen of HighRankings.com.

So Aubuchon continues checking Google for how his key words rank. "We are number one for 'window fan,'" he says in late May. "I'm waiting for the hot weather to come."

—Michael Goldberg



A hand holding a white flag on a green pole, positioned over a complex, multi-level maze. The background is dark, and a small potted plant is visible on the left. The scene is lit by a track light from above.

Users are frustrated...

and every day you spend more
not to fix the problem.



You've tried to integrate your systems, but from your user's point of view, it's still a mess. They can't find what they need to find, or do what they need to do. The worst part is, it's costing you a fortune to frustrate them.

Take a look at Cysive Cymbio®. It's all about making user interaction work.

Download the Cysive® User Interaction
Management White Paper.

www.cysive.com

Christopher Hoenig | Total Leadership

Know Where You Want to Go

The simple path to leadership

IT'S EASY TO MAKE the essentials of leadership too complex. Occam's razor—the principle that basically says, “The simpler, the better”—also applies to leadership. My version of the leadership path comes down to this: The way to lead is to watch where you're going. The path to leadership lies within. Its landmarks are personal commitment, self-awareness and vision.

Commitment

The first step on the path to leadership is deciding to go somewhere—to take a journey and bring others along. The transforming event is the decision: the personal commitment to make a contribution, whether it's to create change, help others, make a discovery or simply explore the unknown.

For CIOs or CXOs, this commitment might take the form of managing an especially complex project, creating an open-source component to the enterprise architecture or supporting the development of a new product as it is brought to market. Those are ambitious destinations with no obvious road map. But by deciding to go someplace and getting others to go there with you, you become a leader.



The door to leadership opened for me when I was just out of college, with an apparently useless history major and clueless about life. I met a man who told me that no one in his organization had been able to solve a particular problem. I took him up on the offer. After more than a year of door-to-door sales pitches and test marketing, I put a new magazine on the map. I had just taken the first step on the path to leadership, making a commitment to go somewhere. It transformed my view of myself as a potential leader.

Later, I became part of a small team investigating options for a new business. One day our thinking finally crystallized, and we wrote the name of the future company down on an old yellow legal pad. I remember looking at that name and deciding that, come hell or high water, I would make it a reality.

It doesn't matter what the challenge is. And it doesn't even matter whether you personally take charge. What's important

ILLUSTRATION BY ALEX NABAUM



Companies everywhere are facing a new kind of threat.
Fortunately, there's a new level of protection.

Introducing Application Intelligence only from Check Point.



The Internet is evolving. So is the technology that keeps it secure. Now Check Point introduces Application Intelligence—a major breakthrough in the evolution of Internet security and a definitive response to the growing problem of application level attacks. With Application Intelligence integrated into Check Point FireWall-1 and Smart Defense, your business-critical systems are safe from both network and application level attacks. By providing the world's only truly integrated security infrastructure, Check Point centralizes and strengthens your defense against attack at every level, every location. Want to take Internet security to the next level? Get the revealing new white paper that tells you everything you need to know about the latest cyber threats, "Internet Security Redefined: A new level of integration, a new level of protection." at www.checkpoint.com/appint/cio

Check Point
SOFTWARE TECHNOLOGIES LTD.



We Secure the Internet

is that you commit yourself consciously to an endeavor, recognizing both the risks and potential rewards, and hold yourself accountable for the results.

Awareness

The second step on the path to leadership is being self-aware. It's watching yourself and how you interact, learning where your strengths and weaknesses lie; watching the path you are on, the danger spots on the road, and what it takes to clear the obstacles ahead; watching where paths diverge, and learning to make choices and live with the consequences; and watching where you are moment-to-moment and in relationship to your overall goal.

Poor performers are typically unaware that they have problems. In contrast, good leaders learn who they need on their team to compensate for their flaws and what types of challenges play to their strengths.

"Awareness training" is now a ubiquitous part of leadership training. Every leadership course has some type of self-evaluation or personal diagnostic. Those are all helpful. But the true path to awareness comes from experience and reflection—learning by doing.

The military practices awareness with intensive training and after-action reviews. The medical profession does it with teaching hospitals. Recent research shows that poor performers are typically unaware that they have problems. In contrast, good leaders learn who they need on their team to compensate for their flaws and what types of challenges play to their strengths. With this information, they can decide which situations to avoid, as well as what critical weaknesses they have to shore up.

For instance, most CIOs still come up through the IT ranks. Yet the demands of the CIO position require much more than technical knowledge. Those who have poor communication

skills—and refuse to improve them—probably won't be CIOs for long.

My own self-awareness emerged at a major consultancy where, with only a modicum of formal training, I was challenged to lead large client teams whose members

knew more about their business than I ever could, to compete with colleagues in a relentless "up or out" system and to deliver lasting value for clients. The constant challenges, real-time feedback and ever greater expectations forced me to think about where I was going. I took notes nearly every night on what I was learning and how to do better. In the end, I was transformed by an awareness of my own capabilities and of world-class quality standards.

Vision

Once you've made the commitment to lead and gained an awareness of your leadership traits, you're ready to take the third step on the path to leadership: setting your vision. This is a different type of choice. It's not just about which challenge to confront, but a matter of what and who you want to be. What is your ultimate place in the world? Where are you now and how can you get to that place? Laying out your own development path that will take you toward your vision is the final step in becoming a leader.

My own vision emerged only after decades of searching and several years of writing and thinking. The process was messy. I received no crystal-clear visions and heard no voices. Many personal demons obscured my path, and false starts and mistakes tested my resolve. Yet those things also served to focus me on the essence of what I wanted to do with my life.

The beauty is that once you reach this place on the path to leadership, you can never really fail as a leader. Whether you succeed or fail in others' minds, accomplish or fall short in any of your endeavors, the act of working toward your vision makes you a leader. Theodore Roosevelt articulated this point perfectly when he said, "Far better it is to dare mighty things, to win glorious triumphs, even though checkered by failure, than to take rank with those poor spirits who neither enjoy much nor suffer much, because they live in the gray twilight that knows not victory nor defeat."

If you can find your own landmarks and communicate your own messages on the path to leadership, you will take your leadership to a whole new level. **CIO**

What are the landmarks on your leadership path? Write to us at leadership@cio.com. Christopher Hoenig is a director of strategic issues for the U.S. General Accounting Office and has been an entrepreneur (CEO of Exolve), consultant (McKinsey & Co.) and inventor; and he is the author of *The Problem Solving Journey: Your Guide for Making Decisions and Getting Results*.



PHOTO BY KATHERINE LAMBERT

For Sale Now

For more help finding your way along the leadership path, look into our **CIO FOCUS** guide **TRUE LEADERSHIP: DEVELOPING AND LEVERAGING THE SKILLS TO CAPTAIN I.T.**, and get the commitment, awareness and vision landmarks. It's for sale now at the CIO Store.

theciostore.com

CIO | O4

Issues ▶ Ideas ▶ Impact

WHERE

JW Marriott Desert Ridge
Resort & Spa
Phoenix, AZ

WHEN

Nov. 2-4, 2003

TO ENROLL

www.cio.com/conferences
or 800.366.0246

You Know Where You Want To Go

How Do You Get There?

Tap the collective minds of hundreds of CIOs at **CIO | O4**

THE ISSUES

economic outlook | ethics in action | security concerns | privacy mandates |
backlash to globalization | social trends | regulatory issues | domestic & foreign policies | loss of IT
jobs to outsourcing | leadership | emerging technologies | state of IT education | business alignment
| vendor consolidation | governance | resource allocation | business continuity

Presented by



The Resource for
Information Executives

Sponsored by



Michael Schrage | Making IT Work

It's All About the Execution

Squeeze Now, Pay Later

A wounded vendor may turn around and bite the CIO who squeezes it too hard

IF YOU'RE A CORPORATE CIO, you care enormously about your company's profitability. But how much should you really care about your *supplier's* profitability? Here's an original idea: If you want to dramatically cut your costs, dramatically cut their profits. This is a buyer's market. Go for it.

That insight was inspired by a recent front-page profile in *The Wall Street Journal* about a cost-cutting telco CIO with a python's flair for squeezing his suppliers. Need a router or a RAID? Verizon's CIO encourages his people to check on eBay to price boxes before their vendor negotiations.

"It's as if you now have a stock market for servers," he gushed. He's also launched an "Offware" program that invites software vendors to present discount-licensing schedules to "off" their business rivals. He told HP, IBM and Sun that their share of Verizon's spending would depend on how low their prices were. "All three immediately lowered their prices 25 percent. Then Sun and HP decided to slash maintenance charges," the *Journal* reported.

But wait! There's more—or less, actually. At a meeting where one of his direct reports insisted that the company "did such a



phenomenal job of vendor-squeezing in 2002 that there's not much more to squeeze," the CIO bluntly responded: "See how much you can push things."

There are two ways to read this piece of news: The first is a fist-pumping, "Yes! What goes around, comes around, and we need the savings." The second is, "Wow, I wonder what happens after the deal gets signed." This column is about the second reaction. After all, CIOs don't merely procure information technologies. They have to implement them.

There's nothing illegal or immoral about squeezing suppliers. It can be an excellent business practice. But it defies human nature to believe that a vendor that has been low-balled, dropped to its knees and capitulated to even the most bizarre buyer demands in a bid to get the business won't be constantly on the lookout for ways to make its money back. There is a point where the perceived sense of economic fairness is violated.

ILLUSTRATION BY ANTHONY FREDA



DOUBTFUL:

"WELL, I'D SAY IT'LL COST SOMEWHERE IN THE VICINITY OF FIFTYISH? IN THAT BALLPARK?"



DEFINITE:

"OK, LOOKING AT THE NUMBERS BASED ON TODAY'S MARGIN, IT COMES TO \$9K EXACTLY."

Nextel Wireless Business Solutions give you a unique advantage: Accuracy.

The facts and figures. You can't keep them all inside your head. And it's not always possible to log in from the road. At Nextel, we can provide your business with real-time wireless applications and technology that will give you the ability to always have the facts. Real-time info access and exchange so you can pull up the numbers you need, when you need them. And DIRECT CONNECTSM, the digital walkie-talkie feature that works nationwide. Call 877-NEXTELC or log on to Nextel.com for industry-specific wireless solutions.



*The BlackBerry® 6510
from Nextel. The only fully loaded
BlackBerry® with a cell phone and digital
walkie-talkie that works nationwide.
The ultimate wireless business tool.*

Financial Services Government Education Healthcare Manufacturing Real Estate Transportation Retail Business Services IT

NEXTEL

The BlackBerry and RIM families of related marks, images and symbols are the exclusive properties and trademarks or registered trademarks of Research In Motion Limited — used by permission. ©2003 Nextel Communications, Inc. All rights reserved. Nextel, the Nextel logo, Direct Connect and the Driver Safety logo are trademarks, service marks, and/or registered marks of Nextel Communications, Inc. Direct Connect coverage may vary from location to location. Check for availability in your local calling area. MOTOROLA and the Stylized M Logo are registered in the U.S. Patent & Trademark Office. All other product or service names are the property of their respective owners.



That's the point at which the extra squeeze creates dangerously false economies. Penny-wise, pound foolish.

I know one company that put the screws to a vulnerable supplier—a network vendor that, in fact, had consistently gone the extra mile in customer support even during the apex of the telecom bubble economy—and renegotiated prices down by one-third. The vendor literally begged to limit the price cuts to 25 percent. The customer declined. The desperate vendor caved. But customer support is now largely e-mailed attachments of technical manual excerpts and hotlinks to relevant FAQs. Crises are handled within 48 hours instead of an afternoon. The two companies hate each other. A friend who works with the cus-

It defies human nature to believe that a vendor that has capitulated to all of the buyer's demands won't be on the lookout for ways to make its money back.

tomers CIO confided that all of their hard dollar savings had vanished within 100 days of the renegotiation.

"We screwed them, and they screwed us," he says. "It's a draw." Intriguingly, the CIO still looks good inside the organization for driving such a hard bargain with a key vendor. But that's only because he's been able to pass the increased support costs to the business units in a way that buries their true origins.

To be sure, no CIO is obligated to care about a vendor's profitability or cash flow. I could make a very good case that the financials are the supplier's business model issue, not the CIO's. But I won't because that would ignore the realities of implementation. Implementations are about managing relationships, not consummating transactions. When a vendor is prepared to slash prices 30 percent, my reaction is not, "Gee, they're desperate—and what lush margins they have." It's, "Gee, they're desperate—what are they going to do to us to make up for these givebacks? How are they going to make me pay?"

The *only* leverage vendors have left in a hostile economic environment of cost-cutting, cutbacks and outsourcing is in the service, support and implementation side of the process ledger. The CIO challenge here is TCI—total cost of implementation—more than TCO. After all, open-source software is ostensibly free. The devil is in the details of implementation. If we save 50 percent in purchasing and procurement at the cost of doubling our service and support overheads, what is the net benefit?

The ultimate issue here has less to do with squeezing suppliers than segmenting them into those you partner with and those you can safely exploit. It's no accident that companies with hugely successful business models—let's pick Wal-Mart, Dell and Toyota as the best examples—have built their global

preeminence in large part by insisting on supplier transparency. Wal-Mart knows the cost structure of its suppliers perhaps better than the suppliers do. Wal-Mart doesn't hesitate to make suggestions to suppliers on how best to conform to Wal-Mart's everyday low pricing ethos.

Similarly, Dell—with virtually no R&D budget to speak of—works intimately with its key suppliers to ensure that they understand what kind of costs and designs are compatible with Dell's build-to-order direct-business model. Dell knows its suppliers' costs. Toyota is famous for sending production consultants and design engineers to its first-tier suppliers. Toyota knows its suppliers' costs too. Supplier transparency is at the core of

Toyota's successful working relationships. Suppliers that can't—or won't—be open to information and cost sharing are gradually weeded out.

There's an important lesson here. In the recessionary 1980s, General Motors created a procurement czar who used his company's massive buying power to beat up suppliers on price. The world's largest automobile company earned enmity, horrible relationships and a reputation for building cars that underperformed. By contrast, a desperate Chrysler couldn't bully its suppliers, so it partnered with them. The feisty company pioneered the concept of "gain-sharing" with its suppliers; that is, Chrysler would let suppliers keep a significant portion of the margins when suppliers came up with innovative ways of cutting costs and adding value. Strong supplier relationships were at the core of Chrysler's corporate comeback.

I'm not a Pollyanna, and I don't believe that companies should always partner with their vendors. Indeed, some vendors—particularly those in the software realm—would probably find it easier and cheaper to cut their prices than invest in what it takes to be a good partner with the customers.

Similarly, the reason why CIOs squeeze suppliers is that, frankly, it's easier than partnering with them. Then again, buying a box is easier than maintaining and upgrading it. CIOs have a business obligation to determine whether the economics of partnership will prove a better investment than the economics of squeezing suppliers. If we really care about successful implementation, CIOs need to respect the reality that even the most artfully negotiated service-level agreement can't withstand the fact that a vendor has no ongoing business rationale to honor it except avoiding a lawsuit. Incentives matter. Don't let the procurement squeeze crush the opportunity to profitably partner. **CIO**

Michael Schrage is codirector of the MIT Media Lab's eMarkets Initiative. He can be reached via e-mail at schrage@media.mit.edu.



PHOTO BY JOHN SOARES

It's not just their names on the line.
(It could also be your neck.)

X

CEO

X

CFO

WHEN THEY PUT THEIR NAMES ON THE LINE, IT BETTER BE RIGHT. But what'll make them feel as confident as you are accountable? Hyperion, that's what. Our new integrated suite of Business Performance Management software gives you and your team a single, accurate view of your financial and operational performance. No other solution provides that kind of insight. Which is probably why 88 of the *Fortune 100* now measure and manage their business with Hyperion. Want to learn how they're protecting their necks? Visit www.hyperion.com/yourneck



Products. People. Problems solved.

From servers to service, Dell has the solution.



Dell | Small and Medium Business

Your business has unique needs. It deserves a unique solution. From PowerEdge™ servers featuring Intel® Xeon™ processors to PowerVault™ Storage and PowerConnect™ Network Switches, we offer tailored solutions to meet your business needs. And of course it's Dell, so you know you're getting the latest technology. But that's only half of the story. Dell offers consulting services that range from deployment and installation to training and certification. All from one source. And everything is backed by thousands of service and support people at your beck and call, on-site, online and on the phone. Suddenly your IT infrastructure doesn't seem so daunting. Let Dell's one-of-a-kind solutions put you on the path to one-of-a-kind success.

Dell Rated #1 in Intel-Based Server Satisfaction

20 Out of 21 Consecutive Quarters

Technology Business Research

Corporate IT Buying Behavior and Customer Satisfaction Study

Fourth Quarter 2002

– April 2003



Call: M-F 7a-8p Sat 8a-5p, CT

Pricing, specifications, availability and terms of offer may change without notice. Taxes and shipping charges extra, and vary and not subject to discounts. U.S. Dell Small Business new purchases only. Dell cannot be held responsible for errors in typography or photography.

*This device has not been approved by the Federal Communications Commission for use in a residential environment. This device is not, and may not be, offered for sale or lease, or sold or leased for use in a residential environment until the approval of the FCC has been obtained.

†Service may be provided by third party. Technician will be dispatched following phone-based troubleshooting. Subject to parts availability, geographical restrictions and terms of service contract. Service timing dependent upon time of day call placed to Dell.



Remote Office & File/Print Sharing

NEW PowerEdge™ 1600SC Server

Reliable, High-Performance Server

- Intel® Xeon™ Processor at 2GHz
- Dual Intel® Xeon™ Processor Capable (up to 3.06GHz)
- 128MB 266MHz ECC DDR SDRAM (Up to 4GB)
- 36GB (10K RPM) SCSI Ultra320 Hard Drive
- Upgradeable to 292GB of Internal Hard Drive Storage
- Embedded Intel® PRO Gigabit[®] NIC
- Six PCI Slots (2-64/100MHz, 2-64/66MHz, 2-32/33MHz)
- 1-Yr 24x7 Dedicated Server Phone Tech Support
- 1-Yr Next Business Day On-Site Service³
- Small Business Pricing

\$749 as low as **\$20/mo.**, (46 pmts³⁰)
E-VALUE Code: 17631-S20707g

For a complete server solution we recommend these additions:

- Hot-Swap Hard Drive Capability, add **\$100**
- PowerConnect 2124* 24-Port + 1GB Ethernet Switch, add **\$299**

Web Server

NEW PowerEdge™ 650 Server

Low Cost General Purpose 1U Server

- Intel® Celeron® Processor at 1.80GHz
- Pentium® 4 Processor Capable (Up to 3GHz)
- 128MB 266MHz ECC DDR SDRAM
- Upgradeable to 3GB of Memory
- 20GB (7200 RPM) IDE Hard Drive
- Upgradeable to 146GB of Internal Hard Drive Storage
- Optional Dual Port Intel® PRO 100S NIC or Single Port Intel PRO Gigabit[®] NIC
- 3-Yr Next Business Day On-Site Service³
- Small Business Pricing

\$949 as low as **\$26/mo.**, (46 pmts³⁰)
E-VALUE Code: 17631-S20709g

For a complete server solution we recommend these additions:

- PowerConnect 3024* Managed 24-Port + 2GB Switch, add **\$549**
- System Including Windows® Server 2003, only **\$1749**

Application Server

NEW PowerEdge™ 1750 Server

1U High-Performance Rack Server

- Intel® Xeon™ Processor at 2.40GHz
- Dual Intel® Xeon™ Processor Capable (Up to 3.06GHz)
- 256MB 266MHz ECC DDR SDRAM
- Upgradeable to 8GB of Memory
- 36GB (10K RPM) Ultra320 SCSI Hot-Swap Hard Drive
- Upgradeable to 438GB Internal Storage Capacity
- Integrated Dual Channel Ultra320 SCSI Controller
- Active ID Front Bezel for Monitoring System Health
- 3-Yr Next Business Day On-Site Service³
- Small Business Pricing

\$1699 as low as **\$46/mo.**, (46 pmts³⁰)
E-VALUE Code: 17631-S20716g

For a complete server solution we recommend these additions:

- NEW PowerConnect 3348* Managed 48-Port + 2GB Switch, add **\$999**
- PowerVault™ 1124T DDS4 External Tape Backup, add **\$1499**

The answers you need. Easy as **DELL**™

Click www.dell.com/bizsolutions Call 1-866-218-3355

toll free

U.S. only. *Monthly payment based on pre-rebate price for 48-month 60 Days Same-As-Cash-QuickLoan with 46 payments at 9.99% interest rate. Your interest rate and monthly payment may be same or higher, depending on your creditworthiness. If you do not pay the balance within 60 days of the QuickLoan Commencement Date (which is five days after product ships), interest will accrue during those first 60 days and a documentation fee may apply. OFFER VARIES BY CREDITWORTHINESS OF CUSTOMER AS DETERMINED BY LENDER. Minimum transaction size of \$500 required. Maximum aggregate financed amount for the paperless acceptance QuickLoan not to exceed \$25,000. If your order exceeds \$25K, a Dell Financial Services rep will contact you to process your documentation. Taxes, fees and shipping charges are extra and may vary. Not valid on past orders or financing. QuickLoan arranged by CIT Bank to Small Business customers with approved credit. ³⁰This term indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1GB/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required. Dell, the stylized E logo, E-Value, PowerEdge, PowerConnect and PowerVault are trademarks of Dell Computer Corporation. Intel, Intel Inside, the Intel Inside logo, Pentium and Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. ©2003 Dell Computer Corporation. All rights reserved.

GO
Online For
Latest Prices
and Weekly
Promotions



CIO David Bergen says Levi's is being squeezed between the high and the low ends of the jeans market. To escape "the jaws of death," as Bergen calls them, Levi's will have to begin selling to mass channel retailers such as Wal-Mart. And that means transforming the company's IT.

HOW S W L GOT ITS JEANS INTO WAL-MART

CIO David Bergen joined Levi Strauss almost three years ago with a mission: Get us ready for the number-one retailer. This summer will tell if his company's IT transformation will help turn around this American icon. BY KIM GIRARD

It's noon on a Tuesday in late April, and the Levi Strauss in downtown San Francisco is nearly empty. There'd be echoes in the four-story flagship store on Post Street if not for the techno-jazz pounding on all floors. As smiling assistants fold T-shirts and straighten 501s, a cargo-style elevator creeps up and down the middle of the building. An old-fashioned sign, picturing a man in a cowboy hat and coveralls, reads "Levi's fits 'em all."

Maybe so. But these days, not enough customers are buying.

Once upon a time, Levi's and blue jeans were synonymous. James Dean looked oh so cool in them. Marilyn Monroe looked...real good. Almost since its founding 150 years ago, the company has been an American icon. But tastes change. For a time, nothing could come between teenage girls and their Calvins. Twentysomethings

started going to malls and haunting The Gap. And by the mid-1990s, Levi's had missed the baggy pant craze that overtook American high schools. In 1996, Levi's sales peaked at \$7.1 billion. Last year, they fell to \$4.1 billion, a six-year low. The competition has nibbled away at Levi's jeans market share, which has tumbled to about 12 percent from 18.7 percent in 1997.

Reader ROI

- ▶ Why Levi Strauss's turn-around depends on Wal-Mart
- ▶ How an old manufacturer is using IT to gain a grip on its supply chain
- ▶ Why a global SAP rollout is next on Levi's project list

Since the peak, Levi's, which also makes casual Dockers and higher-end Slates clothing lines, has seen its customer base pulled apart. On the high end of the market, fickle fashionistas are eschewing Levi's in favor of boutique brands such as Blue Cult, Juicy and Seven. On the low end, moms are buying Lee and Wrangler for their kids because they're affordable (on average \$10 less than Levi's Red Tab) and because they find these brands at the superstores they prefer: BJ's, Sam's Club, Target, T.J. Maxx and so on.

David Bergen, Levi's senior vice president and CIO, says his company is caught in the "jaws of death." "We're getting squeezed," he says in his office in Levi's Plaza, which has a startling view of San Francisco Bay and is about a 30-minute walk away from the Post Street store. But Levi's thinks it may have found a way to cheat a retail demise.

Wal-Mart.

Wal-Mart, the world's largest retailer, is where moms go to stock up on Max and Maddy's school supplies, their juice boxes and, of course, their jeans. So if you want the kids, and the rest of their families, you need to sell at Wal-Mart.

And you need a new product for this new customer. This month, Levi's is introducing its new, less expensive Signature jeans line. (The jeans, for men, women and children, sell for around \$23. They have fewer detail finishes than Levi's other lines. They don't have the company's trademark red tab or stitching on the pocket.) Of course, there's something in it for Wal-Mart. The company, already the largest clothing retailer in the world, wants more affluent customers. To lure them in, it needs big brands. Acknowledging that the company's customers come from a "cross-section of income levels and lifestyles," Wal-Mart Senior Vice President Lois Mikita says the company "continues to tailor its selection to meet the needs of those customers."

Levi's believes the new line, and the new retail venue, will revitalize the company by boosting annual sales by hundreds of millions. With up to 100 million shoppers trolling through Wal-Mart every week, that's not an unreasonable assumption. "Levi has to face

What Wal-Mart Wants

Three characteristics Wal-Mart looks for in a supplier, and has found in Rubbermaid, Hershey Foods and The Stanley Works



Executives at Levi Strauss are hoping business process changes to support their relationship with Wal-Mart will spark a turnaround. But who wins with the number-one retailer? Consultants at Bain studied 20 Wal-Mart suppliers and found that those growing their revenue and profits through business with the giant retailer share three things:

1 They use technology and better business practices to control their costs and slash the price Wal-Mart pays for their products. Example: Rubbermaid.

2 They create new products. Bringing back the same product year after year won't cut it with Wal-Mart. The retailer will either whittle away at your margins, make its own version of your product or look elsewhere for a cheaper version. (For instance, Wal-Mart started its own laundry detergent line.) Example: Hershey Foods.

3 They know their products better than Wal-Mart. They know who's buying their products and what other products land in the shopping cart with theirs. And they know what draws customers to their displays. Example: The Stanley Works. —K.G.

reality," says Ira Kalish, a retail industry economist. "This is a company that's dropped in size 40 percent or so over the past couple of years. The move to Wal-Mart could be sizable." By partnering with Wal-Mart, adds Harry Bernard, an executive at retail consultancy Colton Bernard, "they'll get the volume they'll need to survive."

If it works.

And, to a large extent, the success of Levi's strategy depends on the performance of its technology—and its CIO.

The Mass Market Changes Everything

Levi's decision last November to begin doing business with Wal-Mart changed CIO Bergen's life.

Like every supplier stocking the \$245 billion retailer's endless shelves, Bergen had to rethink his supply chain—every detail of how Levi's jeans, jackets and shirts would get from factories to new regional warehouses to Wal-Mart's 3,422 U.S. stores when they are needed, not before and certainly not after. That's a mighty leap from the demands placed on Levi's by smaller

department store chains such as Macy's (243 stores), or even J.C. Penney (1,049 stores).

Complicating this challenge was the fact that Bergen would be going live with a completely upgraded supply chain system during the back-to-school rush, the worst time for a retailer to roll out a new technology.

But 47-year-old Bergen says he signed on at Levi's in November 2000 for precisely these kinds of challenges. He's sought them out all through his career. In 1981, he helped install The Gap's first point-of-sale system, which tracked both sales and inventory. In 1985, he moved to clothing maker Esprit de Corps, where he managed all IT development before heading back to The Gap to help improve production planning.

When Levi's new President and CEO Philip A. Marineau called in 2000, Bergen was at Carstation.com, a startup with a business model he questioned. He was itching to return to the apparel business. "One of the things that excited me was the changes Levi's was going through," says Bergen, who bears a slight resemblance to the actor Tim Allen and, like most employees milling around Levi's Plaza, dresses in the company's casual

clothes. Marineau came to Levi's from Pepsi-Co in 1999, a year after helping the eternal number-two beverage maker surpass Coke in sales. Shortly after his arrival, he planned a turnaround that would entail making clothes that better met demands of stores and customers—selling to the mass market and tightening operations around the world.

Bergen wanted in. He knew that Marineau's plan to change the line according to what customers wanted would demand big things. More slicing and dicing of customer data and investments in data warehouse technology. He knew that selling to the mass market would require supply chain improvements. He understood that globalization demanded standardized enterprise systems. What more could a CIO want?

After settling into his new job in 2000, he began working to make Levi's technology fit for what the retail world calls the "mass channel," big discount stores where 31 percent of all jeans in the country are now sold. Levi's wanted to play in that channel, and when Bergen arrived, the company was in tentative discussions with Kmart, Target and Wal-Mart, among others. But the water in the channel flowed swiftly; Bergen knew that without a technology overhaul, Levi's would surely drown. He was most concerned that the company's national distribution strategy didn't suit the way Wal-Mart did business. Levi's had a poor on-time delivery record too—the result of manufacturing and logistics problems born when it shuttered company-owned factories in the United States during the late 1990s and transitioned largely to overseas manufacturing.

Making Levi's Wal-Mart Ready

But all of this change took time.

When Levi's and Wal-Mart first sat down to talk, Levi's was not—as Gregg Hammann, Levi's U.S. chief customer officer, recalls—up to the demands that Wal-Mart placed on its 30,000 suppliers.

"Our supply chain could not deliver the services Wal-Mart expected," says Bergen, who spent time at Wal-Mart's Bentonville,



Gregg Hammann, Levi's U.S. chief customer officer, says recent IT improvements have enabled the apparel maker to deliver products on time, 95 percent of the time. Before CIO David Bergen arrived, the rate was 65 percent.

Ark., headquarters during "exploratory meetings" before a deal was signed. Being a supplier to Wal-Mart demands a certain level of performance—and cost control. Wal-Mart drives you to work with your supply chain to put the same requirements on your suppliers that Wal-Mart puts on you. If you can't make your supply chain work, you won't benefit from being a supplier. Period.

At Levi's, executives couldn't track where its product was moving in the pipeline—how many pairs of jeans were being manufactured in which factories and how many were sitting in trucks or in distribution centers.

This wouldn't fly with Wal-Mart, a supply chain pioneer that moves products off its shelves faster than any retailer and expects replenishment on time to keep costs down. Levi's needed to both get a handle on how its products were doing in stores *and* accelerate

the speed at which those products moved from import dock to warehouse to retail shelf.

The lack of information available to Levi's executives translated into poor performance even without Wal-Mart. "Before David, we delivered 65 percent of our product on time to customers," Hammann says. Industry gurus call that a poor performance. "Our rate today is 95 percent," Hammann says. That's a healthy bump that could improve sales by 10 percent to 15 percent, according to Marshal Cohen, senior industry analyst of NPD Group's Fashionworld, an apparel and footwear market researcher. Hammann credits improved demand replenishment systems and forecasting technology the company now uses. Additions include a so-called dashboard Bergen developed that sits on executives' desktops and shows how Levi's 501 jeans are doing with, say, Kohl's depart-

ment stores on a weekly, monthly or annual basis. The dashboard is designed to look like a website and allows executives to click on a specific product to track how it moves from the factory to the distribution centers to the stores. It shows how many pairs of jeans are available at a given time, what the demand is from the stores and whether the company is meeting that demand. "When I first got here I didn't see anything," Hammann says. "Now I can drill down to the product level."

This system, unlike the old one, connects the employees working within the supply chain to the salespeople all the way up to the company's financial office, a change Bergen oversaw. Execs use the dashboard to track trends—such as whether denim shorts are a hot item in a particular geographic area—and to prevent problems. For example, during the third quarter of 2002, when the company started shipping Dockers Stain Defender pants, it expected to sell about 2 million pairs. The dashboard, however, alerted Levi's to that fact that the pants were flying off the shelves and another 500,000 more would be needed to meet demand. Having that information at its fingertips helped the company avoid bungling its inventory, plan in advance and sell more pants, Hammann says. That same sort of information will be crucial to helping replenish Wal-Mart's shelves during the back-to-school season.

Supply Chain Transformation

Bergen says the most challenging part of the technology overhaul was changing from a national distribution system to a regional one. Before, all Levi Strauss 501-style jeans, for example, arrived at stores from four distribution centers in Kentucky, Mississippi, Nevada and Arkansas. This wasn't good enough to meet Wal-Mart's demands for rapid-fire replenishment.

So Levi's has added three "pool points" (in California, Texas and Florida) to distribute in-bound freight to either Wal-Mart stores or to the distribution centers. In addition, Levi's will ship products for each new season in full carton "prepacks" from its distribution cen-

Next Up: A Global ERP Rollout

Levi's bucks the trend by starting SAP now



After joining Levi Strauss in 2000, CIO David Bergen had three letters on his brain: SAP. He knew employees worldwide were unhappy with disparate back-office computer systems. Europe uses a flavor of Baan. Asia and Canada have a homegrown system of HP 3000s integrated with local Windows-based systems. The U.S. business uses a mix of mainframes, and Unix-based midtier and Windows servers. Assessing this lineup and Levi's strategic goals led to the SAP choice, Bergen says.

Working with his team of 450 IT employees in the United States and 250 people abroad, he wants to get the entire Levi's business on SAP. Rivals such as VF Corp. (maker of Wrangler and Lee jeans), along with Adidas, Nike and Reebok are all SAP shops. Bergen isn't deterred by the problems some companies have had installing the systems. If you're in apparel manufacturing, "you only see SAP," he says.

Analysts estimate the project will cost Levi's between \$1 million and \$5 million, plus consulting fees, which Bergen wouldn't confirm. Levi's is bucking the industry-wide trend by going ahead with ERP now. "It's expensive, high risk and requires a lot of cultural change, and unless you have a really compelling reason to do them you don't [during a downturn]," says Paula Rosenblum, an AMR Research analyst.

In Levi's case, the compelling reason was improving global performance, led by CEO Philip Marineau. Bergen says Levi's, which was rapidly losing market share to rivals, understood his argument to install global computer systems to improve shipping, control costs, support future growth and stay current with fashion trends.

The company is moving slowly, however. Bergen's first task as CIO was to get systems in the United States upgraded to do business with Wal-Mart. He says about half of those upgrades will be replaced by SAP applications. Though his methods might sound inefficient, Bergen says he had no choice but to upgrade immediately for Wal-Mart before installing SAP, which is a much more arduous, long-term process.

Levi's first SAP project is set for the end of 2003 in Australia and New Zealand. North America is next in 2004 to 2005—"the big monster," as Bergen calls it. The project includes 5,000 users and will take five years to complete, Bergen says. The question industry watchers ask: Will five years be soon enough? —K.G.

ters to Wal-Mart's distribution centers. The pool points will replenish this supply, working by region to send stacks of jeans to Wal-Mart's distribution network.

As part of this network of facilities, Levi's also developed a scanning tool for its manufacturers to check the accuracy of cartons ready to ship. The company implemented AS2 technology to exchange with Wal-Mart EDI transactions that support collaborative forecasting. And a set of Manugistics applications allow the company to collaborate on demand forecasting, product modifica-

tions and orders planning with Wal-Mart. All of those changes mean Levi's can plan, define and ship prepackaged orders to the retailer. Bergen says testing of the new system went well and the company was on schedule for a June delivery as of press time.

To support the Wal-Mart initiative, Bergen helped put together a cross-functional team of employees from IT, finance and sales who helped with planning. That included supporting everything from ordering to logistics to making improvements to the data warehouse. The company

Divide and Conquer

Levi Strauss takes a three-tiered approach to retail sales to maximize market reach

- 1 Boutiques and high-end department stores**
Jeans sold: Levi's Red, Vintage and Premium Red Tab
Cost: \$95 to \$220
- 2 Department stores such as Macy's and J.C. Penney**
Jeans sold: Levi's Red Tab
Cost: \$30 to \$65
- 3 Superstore Wal-Mart**
Jeans sold: Levi Strauss Signature
Cost: About \$23

SOURCE: LEVI STRAUSS



also upgraded its networks and its U.S.-based applications, and it is testing to see whether its systems will scale to handle orders from all of Wal-Mart's 3,200 stores.

"The changes to support Wal-Mart are extensive," Bergen says. Eventually, about half of the upgrades required to do business with Wal-Mart in the United States will be replaced by the new SAP system the company will install during the next five years (see "Next Up: A Global ERP Rollout," Page 44).

Simon Spence, a senior consultant at Perot Systems who works with clients preparing to do business with Wal-Mart, says businesses benefit technologically from the demands Wal-Mart puts on them as their biggest customer. "Wal-Mart is a great catalyst for them to invest more money than they would previously to stay in business," he says. "That's the way you grow. That's the way you survive. It drives you to work toward becoming a global company."

The First Signs of Turnaround

It wasn't until Levi's had a better window into its business that it was confident enough to do business with Wal-Mart. In May 2002, Hammann and Bergen sat down with a 25-person team for a daylong meeting in San Francisco. "We asked, Is this something we can do?" says Hammann. The team, composed of managers from all parts of Levi's

business, had covered its bases on the project, Bergen says, considering all "people changes, process changes and technology changes."

By September 2002, the group decided to go forward. Hammann is confident. "We went from a company that couldn't shoot straight to where we're very capable of ready, aim, fire," he says.

Wal-Mart's Mikita says she is impressed with the level of detail Levi's "has dug into to make the execution of this new launch 100 percent."

And today, there are encouraging signs Levi's is turning around. Sales for the company's third and fourth quarters grew for the first time since 1996. During the spring and fall of 2002, Levi's started popping up on NPD Fashionworld's top 10 list of brands preferred by young women for the first time in recent memory. "It hadn't been close to that for a while," says Cohen. "Teens hadn't gravitated toward Levi's in years. That was incredible. A lot of that has to do with having the right style in the right place at the right time." Cohen says Levi's plans to upgrade its business processes, and its improved replen-

ishment system has helped the company get the right sizes to the right stores. The question is, Will they be able to sustain it?

"The jury is still out as to whether this structure is going to work," says retail consultant Bernard. Levi's might think it can fool customers into thinking the jeans on a Wal-Mart rack are "real" Levi's, but he's not so sure customers will understand the \$24.99 versus \$50 price difference between the pair at Wal-Mart and the pair at Macy's. And if the jeans aren't selling well at Macy's, what makes Levi's so sure it can sell jeans at Wal-Mart?

Others say it's tough for any supplier to turn a Wal-Mart relationship into a gold mine. "Wal-Mart works with their vendors to make sure [Wal-Mart] succeeds," and that's not a guarantee that the vendors make a lot of money, says Paula Rosenblum, a retail analyst at AMR Research. Indeed, a recent Bain survey of more than 20 Wal-Mart suppliers found that very few were doing everything right to gain on both the top and bottom lines (see "What Wal-Mart Wants," Page 42). "The place where companies do fail is when they aren't bringing anything new to Wal-Mart," says Gib Carey, a supply chain analyst at Bain, who studies the company's supplier relationships. "Wal-Mart is constantly looking at 'How can I get the same product I am selling today at a lower price somewhere else?'"

Nonetheless, Levi's was due to start shipping the Signature line to Wal-Mart at the end of May, beginning with 40 stores. By June, Levi's will be ferrying the new clothes to all U.S. Wal-Mart stores in preparation for the back-to-school rush. Bergen expects some bumps during the first three months. But if all goes well, the company plans to sign new deals with other discount retailers too.

"If I look overconfident, I'm not," he says. "I'm very nervous about this change." That's understandable, considering the uncharted waters. "When we trip, we have to stand up real quick and get back on the horse, as they say."

Preferably wearing a pair of Levi's. **CIO**

Talk to David Bergen

Looking for insight into revamping your own supply chain? **ASK THE SOURCE.** Levi's CIO David Bergen will answer your questions through July 31. Go to www.cio.com/ask.



CIO.com

Kim Girard is a freelance writer in San Francisco. Send your comments to letters@cio.com.



Sumantra Sengupta, CIO of Scotts, a supplier of lawn and garden care equipment, uses human market watchers to back up his company's computer-generated demand forecasts. He also makes sure that the data going into the forecasts is as close to point of sale as possible.

FUTURE RESULTS **NOT GUARANTEED**

Contrary to what vendors tell you, computer systems alone are incapable of producing accurate forecasts **BY BEN WORTHEN**

IT'S BEEN MORE THAN TWO YEARS since Nike Chairman Phil Knight owned up to the sneaker giant's disastrous \$400 million experiment with demand forecasting software. The headlines are well known: Nike went live with its much-vaunted i2 system in June 2000, and nine months later, its executives acknowledged that they would be taking a major inventory write-off because the forecasts from the automated system had been so inaccurate. With that announcement in February 2001, Nike's stock value plummeted, along with its reputation as an innovative user of technology.

But what has since trickled out in court documents from shareholder lawsuits may be even more disturbing because it shines a harsh light on the inherent limitations of demand forecasting software. According to the documents, i2's supposedly state-of-the-art forecasting system couldn't communicate with Nike's existing systems, which impaired its ability to analyze large amounts of product information. At some point, the data even had to be entered in by hand, greatly increasing the chance for mistakes. And the forecasts themselves were way off. Relying exclusively on the automated projections, Nike ended up ordering \$90 million worth of

Reader ROI

- ▶ Why it's a mistake to rely solely on computer-generated demand forecasts
- ▶ How to get the most out of these forecasts with point-of-sale data
- ▶ Why demand forecasts and human expertise are a winning combination

shoes, such as the Air Garnett II, that turned out to be very poor sellers. The company also came up with an \$80 million to \$100 million shortfall on popular models, such as the Air Force One.

Nike isn't the only company with a forecasting horror story. Corporate America is littered with companies that invested heavily in demand software but have little or nothing to show for it. Goodyear, for example, implemented a demand forecasting system in mid-2000 but hasn't shown significant improvement in managing its inventory, and last year the tire company lost more money than the year before.

Yet vendors and academics are still pushing forecasting software. In 2002 alone, companies spent \$19 billion on demand forecasting software and other supply chain solutions, according to IDC (a sister company to *CIO*'s publisher). And in a speech in February, Stanford University supply chain guru Hau Lee extolled the virtues of harnessing software to extract customer knowledge in order to forecast demand.

Many CIOs, however, remain skeptical. Privately, members of Lee's audience com-

plained to a reporter present that the ability to accurately forecast could hardly be taken for granted. And according to a recent Booz, Allen & Hamilton survey of 196 senior executives, 45 percent said that supply chain technology in general had failed to meet their expectations. More than half—56 per-

COMPUTER-GENERATED FORECASTS use historical data to make assumptions about what will happen, but there is no way for them to anticipate major market changes.

cent—blamed the shortcoming squarely on demand forecasting software. From hard experience, a growing number of CIOs now realize that computer systems alone are incapable of producing accurate forecasts.

There are a number of reasons why. To begin with, forecasting systems are only as good as the data put in them and, due to the complexity of modern supply chains—where a company wants to collect informa-

tion about multiple products from multiple customers and suppliers—more often than not the data isn't accurate enough. Furthermore, software can't predict the future, particularly sudden, unexpected shifts in economic or market conditions. Nor can it exercise the kind of rational analysis or

judgement that human beings excel at. Hence, demand forecasting technology is inherently limited, and companies such as Nike and Cisco that rely on it without an institutionalized set of human checks and balances will invariably end up in trouble.

"Demand forecasting sounds scientific," says Sumantra Sengupta, CIO for the Scotts Co., the world's largest supplier of consumer lawn and garden care products. "But I would say that if you looked at the split between people, science and process, people are half the equation. Algorithms are algorithms. That is not what will win the game for me."

Good demand forecasting requires a combination of accurate data and smart people. Up-to-date sales data and point-of-sale (POS) information will almost always improve a forecast. So will having the processes and people in place to make sense of anomalous results or simply to check computer-generated predictions against the pulse on the street.

"Anyone who thinks you can do it with just mathematics and statistics is only partly right," says Doug Richardson, CIO of electronic products maker Vicor. "Human intelligence is also required."

The Whiplash Effect

Before vendors began selling demand planning software, forecasting was essentially a balancing act between compet-

3 Demand Forecasting Myths

1 SINCE FORECASTS ARE ALWAYS WRONG THERE IS NO NEED TO FORECAST.

Inaccurate forecasts can still be useful as long as you treat the result as a guide rather than the gospel. At the very least, having one forecast for the whole company keeps departments from coming up with their own grossly different forecasts.

2 FORECASTING REQUIRES STATISTICS AND MATH WIZARDS.

While number crunching is important, what will ultimately make or break a forecast is how well you know your customers and the market. That requires a sales force that can both communicate with customers and honestly share that information with the rest of the company.

3 ONLY THE MOST EXPENSIVE FORECASTING SOFTWARE WILL WORK.

Contrary to what vendors want you to believe, most forecasting software is pretty much the same. The algorithms have been around for so long now that it is unreasonable to expect that one system's math is better than another's. The important thing when choosing demand software is selecting a system that's robust enough to handle the amount of data that you intend to enter.

—B.W.

Read this story to learn:

How to gain business benefits from smart development of server architecture

How to build the business case for infrastructure investments

How to apply best practices from IT leaders

SIMPLIFY, SAVE, SUCCEED

COMPANIES SEE BETTER BUSINESS RESULTS, NEW COMPETITIVE EDGE, FROM INVESTMENT IN INTEL®-BASED PLATFORMS

Efficient, economical and reliable. These qualities give upstart air carrier JetBlue[†] its distinct competitive advantage in the turbulent airline industry. Amidst competitors known for late planes, diminished service and inflated costs, JetBlue's planes fly on-time, with top-flight service, and at bargain basement passenger fares. To maintain this edge, the company builds its business systems upon an equally qualified IT architecture.

Since its start-up in 2000, JetBlue has standardized on a single computing architecture—Intel. The airline's massive data warehouse and frequent flier

program, TrueBlue, are housed on a range of 4-, 8- and 16-way Intel® Itanium® 2-based Unisys ES7000 servers on Microsoft Windows*. And JetBlue's online reservation system, which delivers 72 percent of JetBlue's revenue, is about to be moved onto Intel's new, enhanced platform, the Intel® Itanium® 2 processor 6M L3. Additionally, the airline runs its internal operations on roughly 250 Intel® Xeon™ processor-based HP servers.

As a result of this consolidation onto a single powerful platform, JetBlue hasn't just boosted computing power—it's saved an estimated 60 percent in

Intel Alliance Profile: Hewlett-Packard†

In the midst of tough economic times, companies are challenged to meet critical objectives such as cutting costs while keeping pace with the enormous rate of change and creating solutions to drive the business forward. Together, HP and its partners are enabling customers like Raymond James and Johns Hopkins University to manage change and get more from their IT investments—more accountability, more agility and a better return on information technology.

Raymond James Financial, one of the largest financial services firms in the United States, is building a data warehouse and decision support system for more than 5,000 financial advisors nationwide using a next-generation Itanium 2-based Superdome* server from HP. "We needed an architecture with exceptional performance and scalability that would help us drive down IT costs," says Tim Eitel, CIO, Raymond James Financial. "Our HP and Windows*-based solution gives us the processing power and scalability for a massive database and data warehouse solution at an exceptional value."

The Johns Hopkins University project maps the universe as a participant in the Sloan Digital Sky Survey (SDSS) and is currently handling over 100 million galaxies in several databases, stored in Microsoft SQL Server* 2000. "With each successive generation of Itanium-based servers from HP, we have reduced the time it takes to analyze the statistical properties of galaxies and other objects by—in some cases—months," reports Alex Szalay, Alumni Centennial professor, Johns Hopkins University.

But performance is only part of the story, Itanium 2-based HP systems offer breakthrough flexibility—with the ability to run HP-UX*, Microsoft Windows* or Linux* on an industry standard Itanium 2-based platform. What's more, with Itanium 2-based HP solutions, customers can achieve more agility, more accountability, and better return on IT than ever before. For more information visit www.hp.com/go/itanium

operational costs by not having to hire people needed to support multiple platforms. This all contributes to an impressive bottom line: in an industry where competitors increasingly bleed red ink, JetBlue grew 63 percent in the first quarter of 2003. Part of that growth easily can be attributed to smart IT spending.

"When JetBlue considers a server solution, we have three important criteria: scalability, manageability and availability," says airline Vice President/CIO Jeff Cohen. "In these areas, [Intel] has been very good to us."

Of course, you needn't be a high-flying startup to benefit from efficient, economical and reliable systems. At a time when IT budgets remain constrained by the weakened economy, IT leaders throughout the industry are increasingly turning to the same scalable solutions, for the same solid business results, that have fueled JetBlue's success.

COMMON CHALLENGES, UNIQUE SOLUTIONS

Operating costs. Maintenance. Infrastructure upgrades. These are among the top challenges for IT leaders who struggle to minimize new spending—while also consolidating and/or upgrading back-end servers to maximize front-end business processes. It's almost a Catch-22, this notion of simultaneously controlling costs while unleashing new computing power and delivering greater business value. Yet companies such as T. Rowe Price, Monster and NASDAQ have met these objectives by building their systems upon flexible, scalable and reliable Intel architecture-based computing platforms. Among the business benefits these companies have gained through smart investments:

Competitive Advantage (see "Successfully Managing Rapid Growth at Monster")

Simplified IT Environments less costly to maintain (see "Server Consolidation at T. Rowe Price")

Greater Productivity and Enhanced TCO (see "Powering the Enterprise at NASDAQ")

Like business/IT leaders everywhere, Doug Busch, vice-president/CIO at Intel, struggles with the same daunting business and technology challenges. And like his peers, Busch strives to do more than just maintain his firm's technology status quo—he's also building for the future. To

Intel in Action: Server Consolidation at T. Rowe Price†

Application and server consolidation: they're among the most compelling uses for Intel architecture-based platforms. Intel-based systems enable multiple and diverse operating systems and application stacks to be consolidated onto a single four-way, eight-way or above server without the cost and complexity of software migration and restrictive proprietary server technologies.

Leading investment management firm T. Rowe Price sought an IT department's wish list: reduced server and storage costs, improved manageability and greater flexibility with headroom for future growth. The answer: consolidation on Intel-based servers.

Boasting \$140 billion in managed assets, T. Rowe Price is in the process of consolidating a wide variety of off-the-shelf and custom applications on its Intel-based servers. At last check, the firm had attained a server consolidation ratio of 26:7 enroute to a goal of 10:1.

To get there, T. Rowe Price consolidated 26 two- and four-way Intel-based servers onto two six-way, and five four-way servers using advanced tools from VMware and Aurema. The VMware ESX Server* offering creates virtual machines-- each isolated from each other—that enable multiple operating systems and application stacks to run efficiently on a single Intel-based server. The 26:7 ratio was chosen to ensure quick payback for the project and to provide substantial room for growth.

T. Rowe Price has found the environment much easier to manage, as changes are easily implemented right up to application landing dates. As an additional sign of a smooth deployment, the support staff has not yet received a single customer complaint. Now the development teams can more quickly test and deploy new applications, while also supporting multiple versions for each as each package evolves.

For more information on T. Rowe Price, visit www.troweprice.com/

achieve these goals, Busch and his IT staff have put their own Intel®-based server innovation to work, and the investment has paid off in ways that also benefit Intel's customers.

Since 1999, Busch and his team have achieved huge savings by transitioning the company's 16,000-server global computing environment to server solutions based on the Intel® Xeon™ processor family. And with the anticipated cost savings from Itanium® 2-based servers, Intel's IT infrastructure will run on complementary platforms that deliver better business results faster and more cost-effectively than their predecessors or competing architectures.

"Given that newer platforms become faster and less expensive over time, the way we approach a server upgrade is to start with a clean sheet of paper," says Busch, who oversees Intel's 4,000-person global technology unit. In advising customers how to achieve greater computing power and costs savings in their own enterprises, Busch recommends the same methodology he employed: **1. Assess** your company's computing requirements; **2. Evaluate** computing price/performance trends; **3. Calculate** the Total Cost of Ownership (TCO) of a refresh; **4. Compare** the TCO of a refresh to the cost of simply buying more of what's already in place—including hardware, software licensing and operational expenses.

Typically, a refresh provides a lower cost structure, Busch says, and enables IT departments to build a scalable, man-

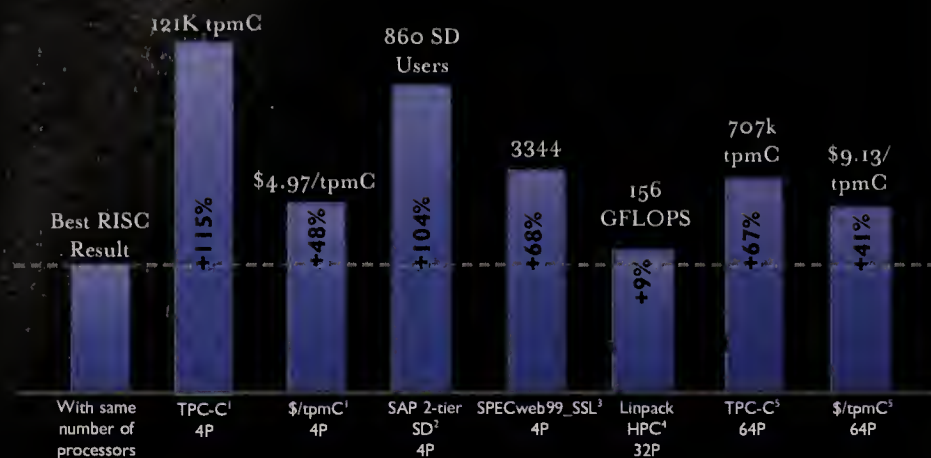
INTEL® XEON™ PROCESSOR MP

Ideal for Mid-Tier CRM, SCM and Business Intelligence

Aimed at medium-sized computing environments, this 32-bit platform is optimized for midsize computer workloads in the application and small to medium data tiers. Ideal for customer relationship management, site management, business intelligence and supply chain management.

- >> For databases <4-16 gigabytes of memory
- >> Broad ecosystem of standard solution providers
- >> Broad deployment enhances interoperability across platforms
- >> Runs thousands of applications

For more information on Intel® Xeon™ processor MP-based servers, visit www.intel.com/ad/servers



INTEL® ITANIUM® 2 PROCESSOR 6M: INDUSTRY-LEADING PERFORMANCE RESULTS

- 1 Source: www.tpc.org; Intel® Itanium® 2 processor results on HP Server rxS670[®] using 4 Intel® Itanium® 2 processors 1.50 GHz with 6MB L3 cache, 64GB memory, Microsoft Windows® Server 2003, Enterprise Edition and Microsoft SQL Server 2000® Enterprise Edition 64-bit, \$4.97 \$/tpmC, availability date B/1/03. Alpha results of \$6.3K and \$9.44 price/tpmC on HP AlphaServer[®] using 4 ES45 processors 1.25 GHz, 32GB memory, availability 09/27/02.
- 2 Source: www.sap.com/benchmark; Intel® Itanium® 2 processor results measured on HP Server rxS670[®] using 4 Intel® Itanium® 2 processors 1.50 GHz with integrated 6MB L3 cache, 24GB of memory, HP-UX[®] 11i, SAP rev 4.6 C, Oracle9i[®]. Best RISC result of 420 from www.sap.com/benchmark on AlphaServer[®] ES45 1000 MHz.
- 3 Source: www.spec.org as of 4/21/03; Intel® Itanium® 2 processors result on HP Server rxS670[®] using 4 Intel® Itanium® 2 processors 1.50 GHz with 6MB L3 cache, 24GB memory, HP-UX[®]. Power 4+ result of 1988 on pSeries[®] 630 Model 6C4 using 4 Power 4[®] processors 1.45 GHz with BGB cache (off chip), 32GB memory, AIX.
- 4 Source: Dell Computer for Intel® Itanium® 2 processor 6M results on a cluster of 16 Dell PowerEdge[®] Servers, each with 2 Intel® Itanium® 2 processors 6M at 1.50 GHz, 4GB RAM, RedHat Linux[®] AS 2.1. Source: http://www-1.ibm.com/servers/eserver/pseries/hardware/system_perf.pdf for Best RISC result of 143.3GFLOPS on IBM eSeries[®] p690 with 32 Power 4[®] processors at 1.70 GHz.
- 5 Source: www.tpc.org; HP Superdome[®] Server, 707,102 tpmC at \$9.13/tpmC, with 64 Intel® Itanium® 2 processors, each at 1.50 GHz with 6MB of L3 cache, running Microsoft Windows® Server 2003, Datacenter Edition and Microsoft SQL Server[®] 2000 Enterprise Edition 64-bit, with 512 GB RAM, TPC-C Availability date: Oct. 23, 2003. Best RISC using HP 9000 Model Superdome[®] Enterprise Server, 423,414tpmC, \$15.64/tpmC, with sixty four (64) HP PA-RISC B700 processors at 875 MHz, running HP-UX[®] 11i 64-bit, Oracle9i[®] Enterprise Database Server 9.2.0.1, 256GB RAM, Available: B/26/2002.

INTEL® ITANIUM® 2 PROCESSOR Ideal for High-Performance Applications

Designed for the most demanding, data-intensive enterprise and technical applications. Ideal for these critical applications: large databases, enterprise resource planning (ERP), supply chain management (SCM), business intelligence and high-performance computing.

- >> 64-bit, with support for 32-bit
 - >> For databases >4-16 gigabytes of memory
 - >> Key databases, tools, and enterprise applications are available now, with others ramping dramatically throughout 2003
 - >> Choice of operating systems, including Windows Server 2003, HP-UX and Linux. Optimized applications suitable for manufacturing, scientific, energy and financial services solutions
- For more information on Intel® Itanium® 2 processor-based servers, visit www.intel.com/ad/servers

ageable IT infrastructure for the future. With the Intel Xeon processor MP and Itanium 2-based platforms, Intel and its customers gain the ability to scale out and up—functionality that delivers the business benefits detailed above.

To provide customers with the computing platforms necessary to achieve these business benefits, Intel poured over \$9.5 billion into R&D and manufacturing innovation in fiscal year 2002. Much of this investment went to enrich the Intel Xeon processor family and fuel the emergence of complementary Intel Itanium 2 processors (see boxes, p. 3 and p. 4).

THE ROI OF ARCHITECTURE INVESTMENT

Intel's R&D investment might seem counterintuitive to cost-conscious IT leaders, but industry analysts say forward-thinking companies are on the right track to reap business value from continued investment in server infrastructure. "Companies under-invest in technology at their peril—even in lean times," reports worldwide management consultancy McKinsey & Co. "New technology, deployed intelligently, can help organizations make dramatic leaps in productivity and redefine competition within [entire] sectors."¹

Enterprise architecture expenditures are an especially smart investment in future business benefits, says Jeffrey Hewitt, principal analyst with Gartner Inc.

"As worldwide economies begin to show recovery, server infrastructure improvements will come back into the picture because companies seek to stay competitive and upgrade aging hardware platforms," Hewitt says. The server market segment's return to growth will be fueled primarily by Intel on the processor front and by Windows[®] and Linux[®] from an OS perspective, he adds.

These market trends and independent analysis point to a common conclusion: IT leaders must meet today's common business challenges—and tomorrow's—by investing in flexible, scalable, interoperable technology solutions. The unpleasant alternative is to risk falling behind in the race to generate new business value and drive innovation.

POWERFUL PLATFORMS = PEAK PERFORMANCE

It isn't just about the infrastructure. Intel Xeon processor MP and Itanium 2 processor computing engines fuel more than a stronger, increasingly versatile IT

foundation. They also enable companies to gain new business process efficiencies, streamlining business functions and enhancing employee productivity.

Business leaders realize that an advanced IT infrastructure can help extend their competitive advantages in key areas and, when coupled with improved processes and capabilities, drive innovation and new opportunities.

"As anyone on the Web knows, continuous enhancement is critical to attracting visitors and staying competitive," says Brian Farrey, president of TMP Technologies, a division of Monster Worldwide, which manages technology resources for its parent company (host of Monster.com). "The [Intel architecture] gives us more options and much faster development times when enhancing our site."

Among the principal business benefits enabled by Intel's

evolving platforms:

Improved Online Transaction Processing and CRM:

Intel Xeon processor MP-based platforms are ideal for mid-tier business critical applications, helping companies in all industries streamline business processes. Among the business results enabled by Intel Xeon processor MP-based platforms: improved customer relationship management, collaboration and business intelligence.

Maximized Databases, ERP, SCM and High-Performance Computing:

The Intel Itanium 2 processor is uniquely designed for the most demanding, data-intensive enterprise applications. These high performing computing engines enable businesses to deploy their highest-end enterprise applications (e.g. large databases and business intelligence) on cost-effective Intel-based servers, instead of those based on RISC architectures.

Intel in Action: Powering the Enterprise at NASDAQ[†]

Like many enterprises in financial services, NASDAQ has banked heavily on—and is continuing to evolve with—platforms based on Intel® processors to keep pace with soaring transaction volumes driven largely by increased demand for instant information.

The company has also recognized the need to simplify and consolidate its hardware architecture to streamline development, deployment and support, having once had over a dozen hardware architectures in house.

Its efforts of late have been to harness Intel® Xeon™ processor MP-based systems to run the database engine for

three emerging market data applications, as well as mission-critical applications launched and repeatedly enhanced over time.

"Intel Xeon processor MP and the future delivery of Intel® Itanium® processor family-based systems hold the key to NASDAQ's long-term business direction," says Richard Lind, SVP, technical operations for the firm. "They've laid out a very well-defined roadmap for driving down the cost of their processor technology while increasing the functionality it provides."

As a result, NASDAQ will migrate to the Intel Itanium processor family to power the core of SuperMontage*, a "matching" engine that continually builds an internal representation of all buy and sell interests in a marketplace, and matches quotes and orders to produce instant execution functionality.

The data is fed into the three market data applications—DepthView*, PowerView* and TotalView*—that are powered by Intel Xeon processors MP and were taken live late last year. NASDAQ uses Intel Xeon processor MP-based Dell 6650* servers running Windows 2000 for the application suite, and has supercharged the database power of a custom application, Surveillance Delivery Real-time (SDR), which analyzes market transactions and sends alerts to analysts for review. SDR handles 2,800 trades and 1,400 quotes per second.

"We're very impressed with the performance and future of the advanced Intel platforms and see them as the foundation for our future computing strategy," says Lind.

For more information about NASDAQ, visit www.nasdaq.com

Itanium 2-based servers provide faster data analysis and high availability in such industries as finance, manufacturing, energy and life sciences.

Enhanced Business Performance, Reliability Two new Intel products, the Intel® Itanium® 2 processor with 6M L3 cache, and the Intel® Xeon™ processor MP at 2.80 GHz/2MB, only improve upon the business results detailed above.

With core frequency doubled to 1.50GHz and the L3 cache doubled to 6MB, new Itanium 2-based platforms are the ideal solution for compute-intensive, high-end enterprise applications. With production software available today from Oracle, Microsoft and IBM, businesses can now deploy back-end databases on Itanium 2-based servers. Moreover, the new Itanium 2 processor with 6M L3 cache maintains full hardware and software compatibility with previous Itanium 2-based systems. Also, all Itanium 2 processors today offer support for IA-32

applications; a new technology called the IA-32 Execution Layer will further enhance this capability in 2H '03.

Meanwhile, the new Intel Xeon processor MP at 2.80 GHz/2MB cache is designed to increase performance levels for mid-tier server applications that demand large amounts of cache for frequent data access cycles. These new levels of speed and scalability are ideal to support robust CRM and SCM applications, allowing real-time access to information or fast data consolidation and analysis to support immediate opportunity identification—to cross-sell or up-sell, for example—and business decisions.

INDUSTRY LEADERSHIP

Intel's industry leadership isn't just a marketing pitch; it's an operating philosophy to ensure that technology solutions address real-world business challenges facing specific industries. Intel drives and jointly develops these solutions

Intel Alliance Profile: Oracle†

Product support from industry heavyweights like Oracle, which has long optimized its software for use with Intel processors, has already contributed to the accelerating adoption of Itanium 2-based servers. Oracle9i® Database is available now for use with HP-UX®, Linux® and Microsoft Windows® Server 2003 64-bit operating systems.

Oracle9i Database offers industry-leading scalability and reliability in both clustered and single system configurations, whether based on the Intel Itanium 2 processor or Xeon processor MP. It provides comprehensive features for OLTP and business intelligence, and delivers low total cost of ownership.

Using Oracle9i Real Application Clusters, an option of Oracle9i Database, running on

Itanium 2-based servers, businesses can deploy and manage Oracle's database on a cluster of several, high-performance, Itanium 2-based servers as easily as on a single, vertically integrated platform. This gives companies high availability, reliability and scalability, without application rewrites.

The Oracle-on-Intel combination has already demonstrated strong success across a wide array of customers including Dell, Electronic Arts, Texas Tech University, and Louisiana's Nineteenth Judicial District Court.

KEY BENEFITS INCLUDE:

Superior price/performance—Intel Xeon processor MP-based servers clustered using Oracle9i Real Application Clusters deliver superior price-performance over non-clustered RISC-based systems. With the Oracle database, Itanium 2-based servers deliver additional and affordable power for the largest of enterprise databases.

Security—Oracle9i Database provides concrete security assurance, the only database built on a history of 15 independent security evaluations.

Low Total Cost of Ownership—Reduce operating costs by consolidating servers onto an Oracle9i Database cluster and Intel Xeon processor MP or Itanium 2-based systems, while improving performance and scalability and also gaining the flexibility offered by a standards-based computing platform.

Latest Technology Advances—The development teams at Oracle and Intel work closely together to guarantee that Oracle9i Database is optimized for both the Intel Xeon processor MP and Itanium 2-based servers.

For more information on Oracle, visit www.oracle.com/intel

in a variety of ways. Among them:

Alliances: Intel works through Original Equipment Manufacturers (OEMs), independent software vendors (ISVs), solution providers (SPs) and system integrators (SIs) to enable customers to have a range of choices among complete, optimized solutions for their server infrastructure. Intel and this solutions community offer ready-made blueprints that help build successful enterprise systems and stay ahead of the competition. And Intel's two server families are backed by a groundswell of operating systems—Windows*, Linux* and Unix*—hardware, software and database support. That support comes from technology leaders such as BEA, Dell, HP, IBM, Microsoft, Oracle, Red Hat, SAP, SAS and Unisys (see "Intel Alliance Profiles" for clear examples of this support).

Services: Customers also have a strong resource to

develop customized, optimized solutions with Intel® Solution Services, Intel's in-house, worldwide professional services organization. At several Intel Solution Centers worldwide, Intel experts design and test high-performance customer solutions on Intel-based servers—such as running heavy volumes of simultaneous workloads for a financial trading solution—to ensure high reliability before deployment. Customers include Virgin.com, Procter & Gamble, Sony Pictures Imageworks, Marriott, Credit Suisse, T-Mobile and Sungard.

Expertise: Through work with global technology leaders, international standards communities and technology end users, Intel has built respected expertise in guiding solutions development to deliver real business value that companies can take straight to the bottom line. Intel's team of professionals with direct industry expertise work with the worldwide technology community in areas like financial

Intel in Action: Successfully Managing Rapid Growth at Monster.[†]

With its traffic having grown 30-fold since 1999, Monster needed a powerful infrastructure that could keep pace with its global growth and increasingly sophisticated site features—while keeping a lid on IT costs.

Monster began to migrate its operations to Dell servers powered by Intel® architecture four years ago. Today, 330 servers, primarily Intel® Xeon™ processor family-based platforms on Microsoft Windows* 2000, run the company's career portal, which accommodates 600 million page views a month and sends out five million emails a day.

Another 700 servers handle the additional Monster Worldwide products—FastWeb*, Flipdog* and JobTrack*—IT and back-end systems.

Thanks to the cost-effectiveness of its Intel architecture-based server infrastructure, Monster spends 5 to 7 percent of its revenue on IT infrastructure, compared to double-digit figures for many comparable Web giants. Those savings have helped Monster maintain 20 straight quarters of profitability. In addition, its Intel architecture-based server infrastructure provides the agility to roll out revenue-enhancing new features in only six weeks.

"Our availability is pretty close to 100 percent," says Paul Nielsen, senior vice-president of Monster's technology service organization. "If we have a problem with a box—which is almost never because of the hardware—we have redundancy within each cluster at each data center, and we have mirrored data centers. We can also pull boxes out for work with no impact to the end user."

Monster is sold on the savings, performance

and the future direction of Intel's processor architecture, having recently invested an additional \$2 million in Intel Xeon processor family-based servers, and has plans to evaluate Itanium 2-based platforms as growth of the site continues to soar.

But just how does Monster know that the basic cost structure and TCO of servers based on advanced Intel processors is less than that of rival platforms? Real-life experience amassed by acquiring several companies with servers based on other processor architectures.

"With these acquisitions, we're seeing the numbers in terms of what they are getting from their infrastructure and what it costs them, which is one of the reasons we migrate them pretty quickly to the platform we have," replies Farrey. For more information on Monster.com, visit www.monster.com

Intel Alliance Profile: Microsoft

Featuring SQL Server* 2000 Enterprise Edition†

With the growing complexity and competitive nature of business computing today, companies require their applications and databases to process and analyze massive amounts of data in a fast and efficient manner. Microsoft SQL Server* 2000 Enterprise Edition is available in both 32-bit (for Intel Xeon processor MP) and now 64-bit (for Itanium 2-based platforms) versions, both of which are designed to help firms scale as their global users continue to grow.

SQL Server 2000 Enterprise Edition 64-bit on Itanium 2-based platforms opens a new chapter in high-end database computing at lower costs than Unix-based systems available today. Microsoft's commitment to Itanium architecture expands the scalability options for memory-intensive data applications such as large-scale e-commerce, data warehousing and analytics.

Best Performance and Price/Performance³: SQL Server 2000 64-bit delivers the fastest performance in non-clustered computing at 707,102 transactions per minute on the Itanium 2-based platform. It also delivers the best performance and price/performance for business-critical solutions on a 4-way Itanium 2-based server. Harnessing Itanium 2-based servers that support up to 512 gigabytes of RAM, SQL Server 2000 Enterprise Edition takes advantage of the advanced memory addressing capability to support rapid growth in mission-critical applications.

Easy Migration and Fast Deployment: Customer databases can be easily migrated from 32-bit to 64-bit, maintaining 100 percent T-SQL compatibility. No changes are required in client applications, which makes the job of database administrators and developers easier when deploying a 64-bit database into their server farm.

And with the ability to install up to 16 database engine instances on a single server, Microsoft offers the best economics of managing multiple types of high-end applications. With this package, companies realize these benefits while continuing to enjoy the familiar database environment, data access and formats to which they have grown accustomed. For additional information on Microsoft, visit: www.microsoft.com/sql

services, manufacturing, retail, government and communications. This is done to ensure that Intel's technology is put to work delivering strong ROI, lower TCO, and meeting specialized industry needs.

McKinsey & Co. recently singled out Intel for its success in delivering solid business results. "Intel has concentrated on new, higher-value goods, thereby generating extraordinary productivity advances as microprocessors and memory chips become exponentially more powerful though not exponentially more expensive."³

And, as shown in customer case studies such as JetBlue, Intel's powerful products, solutions and expertise are driving dramatic new business solutions—and value—across several key industries.

By taking JetBlue's lead—by making smart investments in enterprise architecture—well-established industry leaders find that they, too, can deploy critical business applications that can be described just like the upstart start-up's.

Efficient, economical and reliable.

For more information on Intel® Xeon™ processor MP and Intel® Itanium® 2 processor-based servers and educational opportunities, visit www.intel.com/ad/servers.

Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit <http://www.intel.com/performance/resources/limits.htm>.

The Intel Xeon processor MP and the Intel Itanium 2 processor may contain design defects or errors known as errata, which may cause the products to deviate from published specifications. Such errata are not covered by Intel's warranty. Current characterized errata are available on request.

Information in this document is provided in connection with Intel® products. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Intel's Terms and Conditions of Sale for such products, Intel assumes no liability whatsoever, AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL® PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. Intel products are not intended for use in medical, life saving, or life sustaining applications. Intel may make changes to specifications and product descriptions at any time, without notice.

Copyright © 2003 Intel Corporation. All rights reserved. Intel, the Intel logo, Intel Xeon, Itanium and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

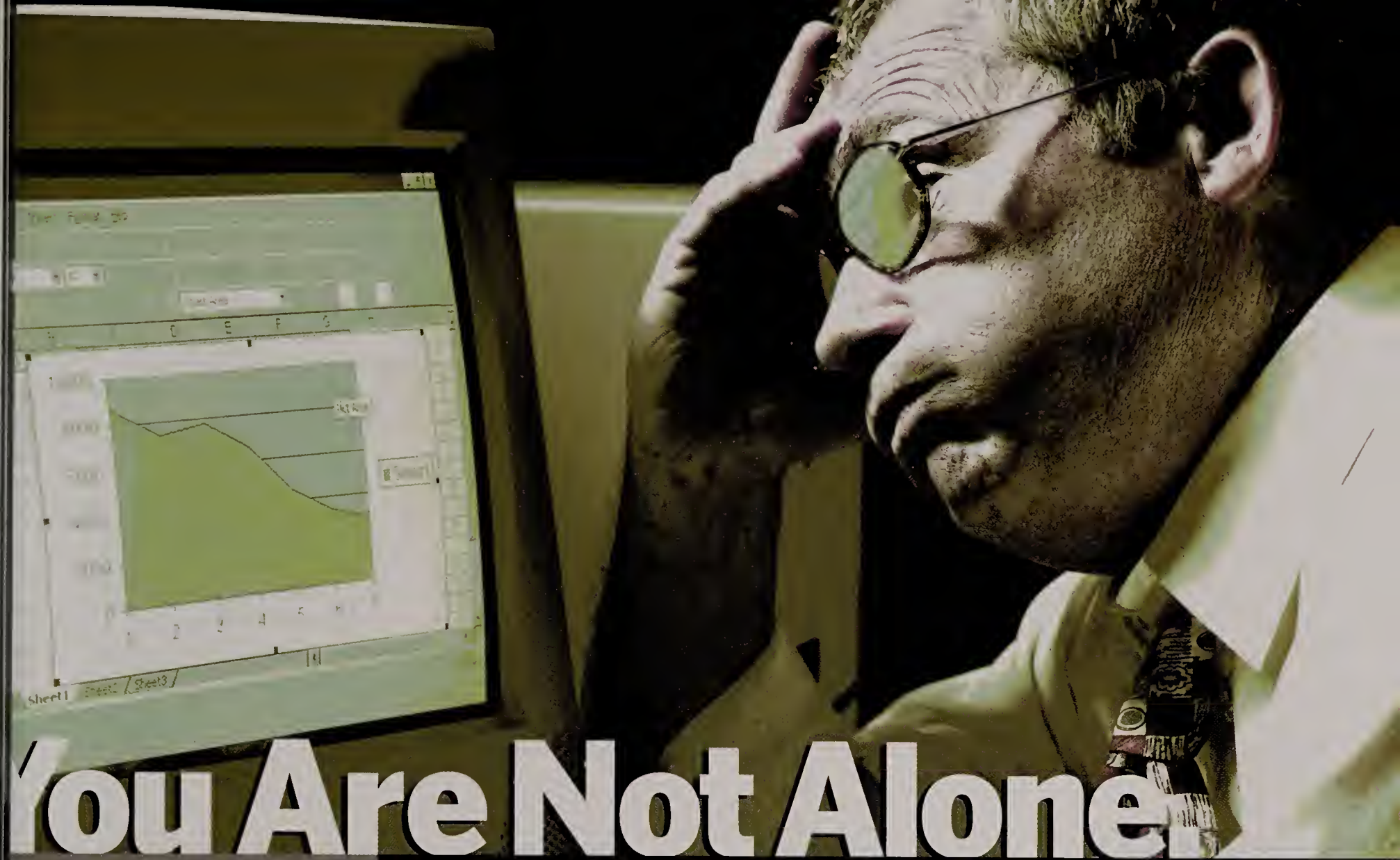
*Other names and brands may be claimed as the property of others.

^{1,2} The McKinsey Quarterly Newsletter, May 6, 2003.

³ Source: <http://www.tpc.org/> As of May 20, 2003: HP Superdome*, 707,102 tpmC, \$9,130/tpmC, with 64 Intel Itanium 2 processors at 1.5 GHz, each with 6MB iL3 cache, running Microsoft Windows* Server 2003, Datacenter Edition and Microsoft SQL Server* 2000 Enterprise Edition 64-bit, with 256 GB RAM; available 10-23-2003

† Results and information are reported by end-user or vendor and not verified by Intel. Results may not be representative and may vary. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing.





You Are Not Alone.

"The Select Member CIO you put me in touch with was knowledgeable, forthcoming and extremely helpful. His shop and ours have much in common. The call was excellent!"

-CIO of a \$7 billion insurance company

"I am getting tremendous value out of the board-level presentations I have downloaded from Select."

-CIO of a \$3 billion manufacturer

BENEFIT FROM THE EXPERIENCE OF YOUR PEERS—JOIN CIO SELECT.

CIO Select is an exclusive networking program that helps CIOs share ideas, documents and advice.

Membership in CIO Select is reserved for CIOs of midsize to large organizations.



The Resource for
Information Executives

CIOSelect

AN EXCLUSIVE PEER SERVICE FOR CIOs

For Information and Membership Pricing:
Contact Martha Heller, Director, CIO Select,
at 508.988.6738 or mheller@cio.com or
via www.cio.com/community/select.html.

Demand Forecasting

ing factions within the enterprise. The marketing department would set a high target because it wanted the product to be a success, says Tom Burns, CFO for the enterprise network division of telecommunications equipment maker Alcatel. Salespeople, on the other hand, would come in with conservative forecasts since they wanted to keep their sales quotas low and manageable. "If marketing says we are going to sell \$150 million, and the salesguy says we are going to sell \$75 million, what do we tell the supply chain guys to build?" Burns asks.

One can see the appeal of a computerized system that could provide an objective answer to that question. Furthermore, the math needed to build these systems has been around for nearly 75 years. It was Ronald Fisher, a British mathematician working

a general trend that as people got older, the rate of death increased. You could then predict that an 81-, 85- or 90-year-old person would be even more likely to die than someone who is 80.

The problem is that regression analysis—and any other statistical model a demand forecasting system may use—requires clean data and a potential relationship among the variables, says Rob Cooley, U.S. technical director at KXEN, a demand forecasting vendor. In Fisher's day there wasn't the computational power to consider more than a few variables, which made it easier to focus on the accuracy of a few data points, like in the rate of death example. But today, computerized systems make it possible to consider hundreds, if not thousands, of variables—anything from weather to time of day—and a correspond-

relatively flat demand. The distributors, however, would react to moderate increases by not only increasing their orders, but by upwardly adjusting their reserve stock, signaling a much larger increase in demand back to P&G. The manufacturer, in turn, would ramp up its Pampers production and continue the bullwhip effect down the supply chain. Ultimately, everyone would be left holding excess inventory.

Garbage In, Garbage Out

The best way to avoid the trap of overforecasting demand is to use point-of-sale information directly from the retailer. Since POS data is an accurate gauge of consumption, it improves the reliability of a forecast. That is how Scotts CIO Sengupta was able to improve his company's fore-

FORECASTS ARE ONLY AS GOOD as the data put in them, and more often than not the data isn't accurate enough. The best way to avoid the trap of overforecasting demand is to use point-of-sale information directly from your retailers.

after World War I, who first conceived of a system that could take numbers, look for patterns and then make predictions based on those patterns. The result, the classic regression model, is still used in 90 percent of demand planning software today.

Regression essentially takes multiple variables, makes inferences about the relationships between them, and ultimately charts the result as a curve showing upward or downward trends. The curve can be extended to predict future results. For example, a regression study of the rate of death among people between the ages of 20 and 80 would, despite numerous exceptions, find

ingly vast number of data points.

Most of these data points are inaccurate, or more specifically, are only an estimate of what actually happened. The most common example is guessing what consumers bought based on what the company itself sold. While a retail store knows how much of a product it sells, the manufacturer only knows how much the retailer orders—and more often than not there are distributors acting as middlemen to further muddy the transfer of information about sales.

Logistics executives at Procter & Gamble studied how this dynamic affected demand planning and found that the further away your data is from the point of sale, the more data accuracy decreased and forecasting errors increased. For example, P&G found that consumers bought its Pampers diapers at a fairly steady clip and that retailers' orders reflected this: Orders had moderate swings one would associate with

casting results. By using point-of-sale data, Scotts increased its forecast accuracy by more than 30 percent in one year.

Before it started using POS data, Scotts would forecast the demand for its products at the national level—but not at the individual store level—for each of its customers, such as Wal-Mart and Home Depot. Each forecast would take into account how much each customer ordered of, say, a particular type of fertilizer in the past and combine that with other factors such as expected weather patterns. Since orders were simply an estimate of retail sales, the process left Scotts susceptible to the bullwhip effect. Furthermore, the sheer volume of the orders greatly inflated the forecasts' margin of error.

Now that Scotts has point-of-sale information from each retail outlet, its forecasts are more accurate and the risk of bullwhips is all but eliminated. Furthermore, the POS data lets Sengupta produce smaller, more detailed

Learn More About Demand Forecasting

To read about how other companies are counting on **FORECASTING TECHNOLOGY** to boost them through this slump, read "They Know What You'll Buy Next Summer (They Hope)" at www.cio.com/071503.

CIO.com

Would You Bet Your Business On This?



Millions do. Yet when disaster happens, your system of offsite storage and recovery may prove slow and unreliable. While waiting days to recover data, business losses just keep piling up.

Ready RecoverySM, from Berbee[®], is the 21st century alternative to data recovery. It continuously mirrors your core business systems – every minute of every day. When disaster strikes, Ready Recovery is ready to bring your mission-critical systems back up in a matter of minutes. With no lost data, time, or business. Ready Recovery is a flexible and affordable solution that lets you protect the systems you can least afford to lose like eCommerce, member/customer data, file servers, email, and other mission-critical systems.

Tape can save your data, but Ready Recovery can save your business. And it's only available from Berbee. For more information, contact:



B E R B E E[®]

Berbee Information Networks Corporation • 5520 Research Park Drive
Madison, WI 53711-5377 • **888.888.8835** • www.berbee.com/ready50

IBM, xSP Prime Hosting and associated logos are trademarks of IBM Corporation in the United States, other countries, or both. This IBM Business Partner has been approved for the IBM xSP Prime Hosting program in North America.



Demand Forecasting

forecasts for each individual retail outlet if he wants (Sengupta says that Scotts actually forecasts in groups of stores to help reduce the impact of a one-time event in one store that wouldn't be replicated in another). Having many smaller, more accurate forecasts further reduces the overall margin of error.

In improving its forecasting process, Scotts has an advantage: The retail and consumer packaged goods industry is well ahead of the game when it comes to sharing data such as point-of-sale information. Most companies in this industry follow the blueprint laid out by the Voluntary Interindustry Commerce Standards Association subcommittee on collaborative planning, forecasting and replenishment.

In the rest of the world, however, most companies aren't in a position to get POS information from their customers. In the first place, few companies collect product-level data at the point of sale. And second, many aren't willing to share data that has traditionally been viewed as a closely guarded competitive secret.

But that doesn't mean you can't get better data and use it to improve your forecasts. In Europe, for example, Scotts gets POS information from only its three biggest customers or 20 percent of its business there—the others either aren't able or willing to share it. "In Europe we understand that we can't get point of sale, but we still try to get as close to the point of final consumption as we can," Sengupta says. In this case, that's when sale items leave the distribution centers. While it isn't the same as point of sale, Scotts at least knows where its products are going and how much has actually been sold to retail outlets, which is more accurate than traditional order information. Furthermore, the distribution center is several days closer to the eventual point of sale than Scotts' own warehouse, making that data a better indicator of current market trends.

There is other data available that can help CIOs improve the data in their forecasts. Imperial Sugar Vice President and CIO George Muller says that his company combines the order information it receives from



Doug Richardson, CIO of Vicor, says his company was left with a massive inventory glut after computer-generated forecasts failed to foresee the economic downturn. Vicor then set up a dual forecasting process in which the sales department comes up with one forecast and the upgraded computer system makes another. Vicor executives arrive at a final figure using both forecasts.

its customers with market intelligence reports from Information Resources Inc. data about what actually gets sold in stores. The IRI sales data, which will show, for example, how much sugar was sold in Atlanta area supermarkets, can serve as a surrogate for point-of-sale data. At the very least, it gives Imperial Sugar something to check its order data against.

Taking the Market's Pulse

Even if a demand forecasting system had 100 percent accurate information, there is another problem: The past can't predict the future. Computer-generated forecasts use historical data to make assumptions about what will happen, but there is no way for

them to anticipate major market changes. For example, Belvedere International, which is based in Ontario, Canada, makes skin-care products. When SARS broke out in Toronto, Belvedere sold more than a year's worth of its One Step hand disinfectant in a month. No forecasting system could have predicted that. Belvedere has kept its assembly line running 16 hours a day, six days a week—modifying production of other goods in the process—just to keep pace with demand. "It's no different from forecasting the weather," says Gene Alvarez, Meta Group's vice president of technology research services. "Once in a while something the model couldn't figure out catches them off guard. Same thing happens with con-

sumer taste and demand.”

Even forecasts that are made with a limited number of variables and with accurate data will be off. They still make the fundamental assumption that what was true yesterday will be true tomorrow. But because the data about a change lags behind the change itself, it takes human market watchers to note business climate alterations.

Vicor, which manufactures power converters for electronic circuit boards, found this out at the beginning of the recent economic downturn. Until a year ago, the company had used a homegrown forecasting system that it had built in 1993. CIO Richardson describes it as a straight-line forecast based on sales history. Company executives relied solely on the automated forecasts to predict demand for their products.

“It was reasonably good in the ’90s when

thinks the salespeople are merely cautious; a cynic might point out that they are compensated for selling above quota). On the other hand, the computer system won’t necessarily pick up on changes in the market that salespeople can often see.

For example, month after month, one telecom customer of Vicor kept placing the same order, and month after month the computer spit out a flat forecast. But a sales manager in the field found out that the telecom increased its order with another supplier whose parts are used in the same product as Vicor’s. The sales manager talked to the telecom company and found out that the company had indeed decided to ramp up production, and armed with that information, Vicor increased its production as well, and was thus prepared when the telecom placed a bigger order.

that the close proximity fosters collaboration between the planners and Scotts’ customers.

In the end, the demand forecasting failure at Nike and other companies can be laid squarely on the shoulders of executives who put too much faith in technology. Court records in the lawsuits by shareholders against Nike reveal that executives for the sneaker company didn’t even hold meetings to review and discuss the computerized forecasts that turned out to be so disastrously wrong. In other words, Nike management neglected to put in place a high-level process of human checks and balances for the computerized forecast. While that negligence actually enabled Nike executives to successfully argue that they were initially unaware of the flawed forecast that was generating such a huge inventory glut, it was a Pyrrhic victory. The company still lost \$180 million in sneaker

COMPANY EXECUTIVES MUST WEIGH IN on the computerized forecast and analyze how it squares with information from their sales and marketing reps. Only then should they sign off on a number that the whole company can live with.

demand was increasing at a nice steady rate,” he says. “Where it broke down was when the product mix increased and the business downturn started.”

Vicor didn’t see it coming. In a conference call in April 2001, CEO Patrizio Vinciarelli said that shipments “fell off the table,” and the company was left with a massive inventory glut. “When the future doesn’t resemble the past, none of this forecasting software works well,” Richardson says.

The mishap taught Vicor the necessity of factoring human intelligence into its forecasts. In order to make sure that it isn’t caught off guard again, the company set up a dual forecasting process in which the sales department comes up with a forecast and the computer system, which was upgraded a year ago, makes another. The two are complementary; the sales department is too conservative with its forecasts (Richardson

While Vicor uses computer-generated demand forecasts as a check and balance for the human-generated forecasts, Scotts takes a slightly different approach. It takes its computer-generated forecast and distributes it to designated forecast planners for feedback. The planners, who are experts for the store and area they represent, make changes based on their expertise. For example, a planner in the Northeast might lower a forecast due to bad weather that limits gardening, or another might increase a forecast if he knows that a particular store is planning a promotion. Scotts takes one unusual step to ensure that the planners have access to the most up-to-date information: The planners actually work in the office of the customer company’s buyer. If, for instance, the planner represents Home Depot in a particular region, he works in the office of Home Depot’s buyer for that region. Sengupta says

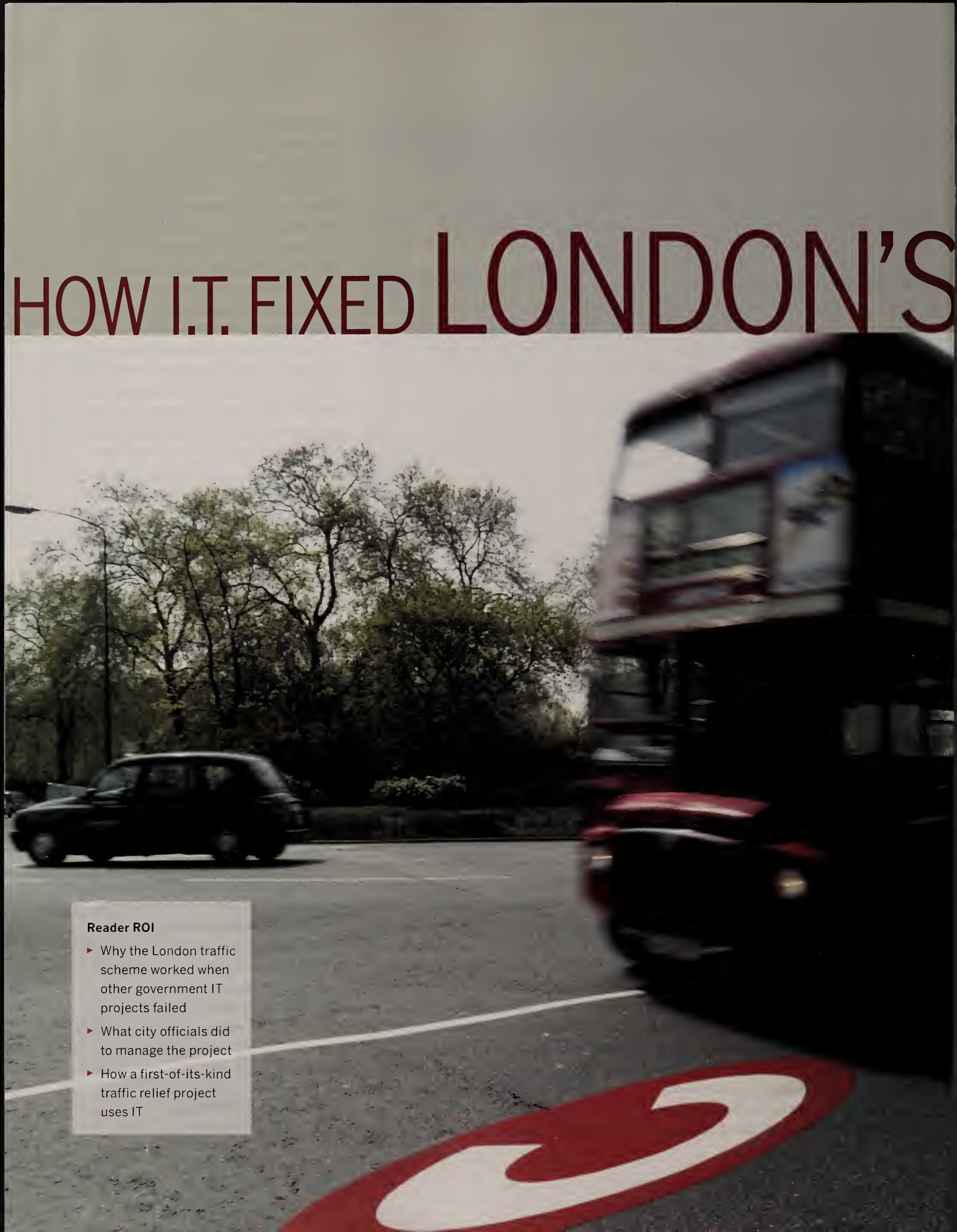
sales and a third of its stock market value.

The Nike case powerfully illustrates that forecasting, no matter how advanced vendors claim their technology is, has to be an executive-level process. Executives need to review the computerized forecast and analyze how it squares with information from their sales and marketing reps, and then sign off on a number that the whole company can live with. At Alcatel, executives meet on a regular basis to dissect and discuss forecasts, which are produced by combining computer readouts with human intelligence.

“The final meeting here is attended by me, the head of supply chain and the heads of marketing and sales,” says Alcatel CFO Burns. “We all have to approve the decision. We live and die by it.” **CIO**

Share your demand forecasting stories with Staff Writer Ben Worthen at bworthen@cio.com.

HOW I.T. FIXED LONDON'S



Reader ROI

- ▶ Why the London traffic scheme worked when other government IT projects failed
- ▶ What city officials did to manage the project
- ▶ How a first-of-its-kind traffic relief project uses IT

BY MALCOLM WHEATLEY

TRAFFIC WOES

In a nation known for spectacular IT failures, a new traffic reduction scheme has gained global attention for its smashing success. The secret? Strong project management applied to well-designed systems.

In 1903, 10 years before Henry Ford began mass-producing automobiles, traffic traveled through central London at a sedate 12 mph, with horses providing most of the motive power. One hundred years of progress later, the average speed had slowed—yes, that's right, slowed—to just 9 mph. As in other major cities, traffic congestion has negated a century of determined innovation of the internal combustion engine. Figures showed that London's drivers spent around half their time in queues, incurring 2.3 minutes of delay for every kilometer they traveled.

But on Feb. 17, 2003, London began to fight back. The British capital launched an anticongestion scheme, based on tolls, that is attracting attention from all over the world. Unlike American-style tolls, though, there's no sitting in queues waiting to pay. Or transponders.

Instead, 688 cameras at 203 sites scattered across the 8-square-mile anticongestion area photograph the license plates of the 250,000 cars that traverse it each day. Enter the anticongestion area marked by a red C logo painted on signs and streets. Get pho-

tographed. And get ready for a one-off charge payable for that day, irrespective of how long the vehicle is in the zone, or how many times it is photographed. At a data center in central London, Automatic Number Plate Recognition technology is then applied to convert the photograph images to license numbers. Motorists who don't pay the toll that day are fined about \$130, automatically. (See "London Traffic Scheme: How It Works," Page 58).

Now, London's traffic scheme is high profile. The mayors of New York City, Paris and Tokyo are all said to be watching with interest. The reason? Fines and tolls combine to give the project a payback period of about a year and a half, and should in total generate an eye-popping \$2.2 billion in 10 years—all of which is earmarked for spending to improve London's public transportation systems. Best of all, according to a report cited in *The Independent* newspaper in March, traffic in the city's center had fallen by 20 percent, improving journey times by 5 percent. Transport for London, the U.K. capital's transit authority, won't report on the scheme's effects until



August; but officials say they expect delays caused by congestion to fall by 20 percent to 30 percent, saving drivers 2 million to 3 million hours of frustration every year. And on present form, the authority seems set for a pleasant surprise: It had been expecting traffic to fall by only 10 percent or 15 percent.

In the British public sector, IT projects often fall flat on their faces. (See "Her

Majesty's Flying IT Circus," which catalogues failure on a scale nothing short of heroic, at www.cio.com/printlinks.) And, as these words are written, Britain's tax authorities are defending yet another botched computer-laden initiative—a new tax credit system developed for Britain's Inland Revenue department that has seen millions of working parents receive late payments, caus-

ing in some cases severe hardship.

And the omens for London's congestion charging scheme weren't auspicious: a tight implementation timetable, no preexisting model anywhere in the world to follow, the challenge of integrating new technologies—plus a brand-new transit authority working under a brand-new mayor. The inevitable question: In an area littered with IT disasters, why should this one work? The answer: an intriguing blend of clever procurement, vigorous project management, careful design—coupled with savvy and determined political leadership. (See "Why It All Worked," Page 60.)

If *The West Wing* ever has a traffic congestion charging plotline, expect it to look a little like what you're about to read....

The Man Behind the Plan

London's first elected mayor made traffic congestion his main priority



London Mayor Ken Livingstone: also known as Red Ken because of his left-wing positions.

The London traffic toll scheme wouldn't have happened without Mayor Ken Livingstone's commitment to it. And Livingstone's commitment wouldn't have been possible without the decision by the incoming Labor administration in 1997 to emulate an American idea: directly elected mayors in a handful of British cities, among them London. (Past London leaders were chosen from the elected city council members.) To Prime Minister Tony Blair, this looked to be a novel way of tackling perennial problems—in London's case, its poor transport infrastructure.

Blair had a nominee, but his plan derailed when a controversial Labor member of parliament named Ken Livingstone announced he would run as an independent. And run as someone who opposed the government's notion that the

London Underground should be privatized.

Livingstone, 58, a man for whom the words *maverick* and *firebrand* might have been invented, is a veteran London politician dubbed Red Ken for his brand of left-wing politics, such as his advocating for gay rights legislation and British concessions in Northern Ireland.

In May 2000, when the dust settled on the three-way race for London mayor, it was Livingstone by a landslide.

On July 3, 2000, Transport for London was born, tasked with managing London's hitherto separately managed transport services: roads, buses, river boats and taxis. Within days, Livingstone was talking about congestion charging. One early confidante was Derek Turner, London's traffic director at the time. "He wanted to know how long such a scheme would take to implement, and what the risks were," recalls Turner. Weeks later, Turner found himself in an ideal position to find out, when Livingstone—the chairman of Transport for London—appointed him the agency's managing director of street management.

Livingstone, referring to the need "to tackle the congestion which cripples this capital city," said when the traffic charging plan began in February: "From today something is being done. If we want London to continue to be a success story for business and jobs, then we must enable people to move around the heart of London more efficiently. Congestion charging is the only option available—there is no practical alternative."

—M.W.

AN UNCHARTED ROAD

From the outset, the risks were obvious. Quite simply, nothing like this had been attempted in a capital city before. Nor did London's streets lend themselves to the toll-charging proposal, explains consultant Derek Turner, former head of street management at Transport for London. Cramped, narrow, convoluted and literally hundreds of years old, they would require cameras to be sited very carefully in order to achieve sufficiently high levels of number recognition accuracy.

Not only that, but the city's leadership was new, part of a process to have London voters directly elect their mayor for the first time in 2000. This led to the ascension of Mayor Ken Livingstone (see "The Man Behind the Plan," this page). Coincidentally, Transport for London, the government agency established to upgrade the metropolitan area's public transit systems, also was new and untested, staffed by people drawn from a clutch of predecessor organizations with different policies, practices and cultures.

Of course, various anticongestion schemes had been discussed and mooted over the years. Livingstone was determined that his tenure would see action, rather than yet more talk. A 1998 independent government white paper previously had highlighted two options—a clampdown on workplace parking and a

All kinds of technology for all kinds of companies.

Gateway's full line of technology products and services means business.



Workstation Solutions



Mobile Solutions



Networking Solutions



Whether you're a small business, a large corporation or somewhere in between, Gateway has a technology solution that's sure to fit just right. Fact is, our full line of servers, desktops and notebooks makes up the information backbone for successful companies of all sizes and types. Our services are equally relied on. And complete. Everything from installing and integrating new equipment to monitoring and troubleshooting entire systems. What makes our services a cut above the rest is how we provide them. We work with you every step of the way, based on your needs, to keep business moving forward.

| 877-239-5535 | 877-891-7047 | www.gateway.com/work |

Small and Midsize Business Corporate and Enterprise



London Traffic Scheme How It Works

- 1** Winston drives his Astin Martin into the charging zone.
- 2** A camera takes a photograph of his sedan's license plate.
- 3** The camera sends analog signals to the city's Automatic Number Plate Recognition computer system in central London.
- 4** The license plate data captured by the camera gets compared to a database of license plate owners.
- 5** The system identifies Winston's car. He is liable for the congestion charge for this day (about \$8).



camera-based toll system. Deeming the parking clampdown to be a political bombshell, Livingstone told Transport for London to get on with the camera-based system. The deadline for delivery: Feb. 17, 2003, one year before the next mayoral election.

For Livingstone, the political risk was huge. He could expect any failure to be viciously seized upon.

That was the bad news. But there were some positives too. Undeniably, the scheme was positive with the public. If Livingstone could pull it off, another election victory

seemed assured. And why would a toll system prove popular? Quite simply, most people wouldn't be required to pay it. Although 1 million people entered central London by all forms of transport every morning, 85 percent of them did so by public transport. A minority (motorists) would pay to improve the lot of the vast majority.

And there were ways of minimizing the political risks. In retrospect, one of the smartest moves of the whole project was a decision by Transport for London to recognize its own limitations—limitations in terms of experience, IT ability and management time. (Officials such as Turner, don't forget, were very busy. His days were filled with bringing the capital's streets under a single management for the first time.)

TIME TO OUTSOURCE

Accordingly, explains Malcolm Murray-Clark, one of the two directors appointed by Turner to oversee the scheme, Transport for London made the decision to outsource critical elements of the project management of the scheme—first to consultants from

PricewaterhouseCoopers, and second to consultancy Deloitte & Touche.

Very early on in the project, then, project managers identified the critical technical elements of the scheme and made judgments about the costs and risks of acquiring these as part of a big-bang solution or instead going for a best-of-breed approach. U.K. public-sector IT projects have often favored the big-bang approach: The congestion charging scheme went the other way. Managers divided the project into “packages” that could, if required, be bought and managed separately.

There were five such packages: the camera technology to be used; the image management store where the images would be collected, turned into license numbers and condensed (duplicates would occur when one vehicle was photographed by several cameras); the telecommunications links between the cameras and the image store; the customer services infrastructure, including the ability to pay by phone, Web and mail; and finally, an extensive network of retail outlets, enabling people to pay at shops, kiosks and gas stations.

Vital Stats

-  Congestion zone is **8 square miles** in central London
-  **688 cameras** at **203 locations** to record license plates
-  **174 entrances** and **exit points** to and from the zone
-  Drivers are charged when they enter the zone weekdays between **7 a.m.** and **6:30 p.m.**

6

Winston can pay his charge online; by mobile phone text messaging; at self-service machines; by phone; by mail; and at 229 retailers within the zone and 10,000 others nationwide. If he doesn't pay by 10 p.m. today, he's liable for an \$8 fine (for a total of about \$16).

7

If he fails to pay by midnight, the fine is about \$130; after 28 days, the fine rises to about \$200. Three-time offenders may see their autos towed or "clamped" and be subject to further fines.

Results

20% drop in traffic congestion

5% faster travel times within the zone

\$2.2 billion in funds to be raised over 10 years for public transport projects

SOURCE: TRANSPORT FOR LONDON

And even at this early stage, the policy of risk aversion was having an effect. Murray-Clark says one option would have been to lump the customer services infrastructure and the retail side together in a single customer-facing operation. Instead, retail was seen as a big enough challenge to be bought and managed separately. Likewise, the mere existence of the five packages underpinned a determination to go for best-of-breed in each instance—in every case, the package had to be the best available.

PUTTING CONTRACTORS THROUGH THEIR PACES

Shortly after London's 2001 New Year celebrations had ended, Transport for London began inviting tenders for the five packages. The \$116.2 million in IT-related contracts made the project large enough to require listing in the European Union's public-sector register, and tenders were open to companies throughout Europe. Again, the consultant-designed procurement strategy came into play: The camera and communications packages could be bid for separately, while the remain-

ing three could receive bids on a combined basis, or individually. "Ideally, we wanted a single provider, but were retaining the ability to mix and match," says Murray-Clark.

While selecting the camera and communications packages was straightforward, the remaining three packages—the bulk of the IT work—proved more problematic. A long-listing process, managed by Deloitte & Touche, brought the original 40 or so bids down to four. "We went through a couple of months talking to all four, and then reduced the bidders to two," says Murray-Clark.

At this point, the procurement strategy dictated another move that in retrospect seems astute. "We told the two bidders that before we could make a decision, we wanted them to undertake a technical design study," he explains. Taking three months, this step would firm up the technical issues underpinning the contracts—issues such as data throughput, how the retail channels would work, how to achieve the best number recognition performance, and what payments might be expected through each payment channel.

From the perspective of the procurement

strategy, explains Murray-Clark, the clever thing about the technical design stage was that it added a lot of value without actually holding anything up. "We were moving ahead but still using the competitive element of the bidding process to get the best solution," he says. The move wasn't without cost—the two bidders were each paid for the work—but the theory was that the cost of paying the losing bidder for doing the work would be more than outweighed by the benefits of using its work to improve the overall quality of the project.

And it was this phase of the project that highlighted the fact that from the technical point of view, the greatest challenge was going to be the creation and management of the image store. It had to process a million records each day (picture those 250,000 vehicles moving about the city center all day)—as well as store them for evidentiary purposes for the subsequent prosecution of nonpayers. Meeting the challenge meant carefully evaluating design considerations (such as using the most reliable technology available) and writing software code that would automatically detect which image of a passing vehicle would yield the most accurate number recognition.

From the perspective of The Capita Group, the winning bidder that emerged in December 2001, the process was a confidence booster. "The experience of the technical design study was actually quite a useful one because it created confidence in both us and Transport for London about how the scheme would work, and how long it would take," recalls Simon Pilling, executive director at Capita, who was in charge of the project. "The deadlines were very tight and were politically driven, and it highlighted where the risks were."

Some of those risks were outside Capita's control, of course. (London officials were anticipating some kind of legal challenge to the scheme, and the city beat back a challenge from the Westminster district arguing that it would unfairly impact them.) But for the rest of it, the company was on the firing line. The contract included, explains Murray-Clark, "a very robust set of liquidated damages against

the contractor for failure to deliver against the timescale. We set out the [market] stall, they agreed that that was what they would produce, we agreed to the milestones for getting there, and we agreed on the consequences of not getting there.”

There was one additional ingredient: third-party oversight for the main contractor. Despite assigning people who as Pilling puts it “had spent a large part of their working lives on large government projects,” Transport for London required that Capita agreed on project management methodologies with the consultants from Deloitte & Touche *before* work could commence. “They were the advising consultant, and their job was to report on how it was being performed,” explains Pilling.

GETTING IT DONE

The project plan showed that some 300 years of effort would be required—effort that would have to be done in little over a year, if the project was to go live as planned. From the outset, Transport for London, advised by Deloitte, was determined that milestones would be rigorously monitored. “We had a statement of requirements that said, ‘This will happen at this point in the process—now demonstrate it,’” says Murray-Clark. “We’d decided early on that testing wasn’t something that could be skimmed—as problems were identified, they were ranked in order of priority, and fixed.”

Capita had bid for three packages (image management, customer payments and the links to retailers), and it won them all. Transport for London, however, preferred to deal with one prime contractor, and so it awarded the company the task of managing the camera and communications parts of the project as well.

Far from complicating the task, selecting one company probably made it easier: Capita had decided at the outset that all the people working on the project—Capita personnel and subcontractors—would be physically located together in a single building in Coventry, in central England. “If you want a project to work well, it makes sense to bring all your team together—putting everybody together

Why It All Worked

An expert identifies the reasons for the traffic project’s success

Though he doesn’t claim to have studied every facet of the London traffic congestion scheme, Richard Heeks, senior lecturer in IS at the University of Manchester, has seen a number of British public-sector IT projects gone wrong. Heeks, editor of *Reinventing Government in the Information Age: International Practice in IT-Enabled Public Sector Reform*, notes that the London traffic project’s managers were guided by three principles: a narrowly focused goal, getting vendor partnerships right and testing.

“The partnership between Capita and Transport for London has clearly worked well, and worked in a way that hasn’t in other big government IT projects,” Heeks says.

Compared to some other government IT projects—modernizing the Royal Mail or reinventing the U.K. Passport Service, to name two—the London traffic project “is a pretty simple and relatively focused project with very clear objectives. In contrast, many of those failing government projects have involved human elements, and they have had unclear objectives,” he says.

Lastly, an emphasis on testing was crucial. “They really, really tried it out before the go-live date. They had thought about what could go wrong, tested it and sorted out any issues beforehand,” says Heeks.

—M.W.

cuts out a lot of bureaucracy, time wasted through traveling, and means that the only videoconferencing we were doing was with the client, back in London,” observes Pilling.

The views of the subcontractors are hard to elicit. Essentially, Transport for London has banned them from speaking publicly about the charging scheme, a decision that insiders say is unlikely to ever be reversed. “It was a contractual decision that we made early on in the process,” says Murray-Clark. “This was an extremely newsworthy project, and we needed to speak clearly and with a single voice.”

But the subtext is also clear. Prime Minister Tony Blair has shown a mastery of public relations far ahead of his opponents. Livingstone wanted his administration controlling the spin on this project.

DELIVERY

As the days after Feb. 17 showed, the news was of course good. In fact, it’s hard to find a negative aspect to report—with the sole exception that because so many drivers have been deterred from entering central London, revenue may be below expectations. But for a project with the primary objective of reducing traffic rather than raising revenue,

that hardly counts as a major failure.

Why did it work out so well? In addition to the attention paid to procurement and project management, Murray-Clark and Pilling point to a few other factors. First, scope creep was vigorously guarded against—with one of the few add-ons, in fact, being the option for motorists to pay tolls through the popular SMS text messaging format. Second, Capita’s deliverables were spread out over a manageable timescale, rather than concentrated toward the project’s end. And third, notes Turner: “It simply wouldn’t have happened without a strong political leadership and will.”

Finally, adds Murray-Clark, “The trick was to not use any new technology—all the technology was proven. What had never been done before was to integrate it—and to do it on time and on budget.” **CIO**

Freelance writer Malcolm Wheatley is based in Devon, England.

Learn More About U.K. IT

To tour the rubble of the U.K.’s early push for e-government, read **HER MAJESTY’S FLYING I.T. CIRCUS**. Find the link to it at the online version of **HOW I.T. FIXED LONDON’S TRAFFIC WOES** from www.cio.com/071503.

CIO.com

Leadership:

Combining innovation and performance.

3Com® helped pioneer networking technology nearly three decades ago—and we've never looked back. Today, 3Com 10/100 switches continue to lead the way with outstanding performance, flexibility, reliability and value. No matter how small your budget or great your demands, 3Com has the switch to meet your needs.

Advanced capabilities for the enterprise

Feature-rich 3Com SuperStack® 3 Switch 4400 family switches are ideal for high-performance environments running IP telephony, Power over Ethernet, security, or where a highly optimized, resilient network is needed.

Unmatched value for small offices

Economical 3Com SuperStack 3 Switch 4200 family switches offer Layer 2 switching that's easy to install, operate and afford. Built-in stacking, wirespeed performance, ease-of-use features and standards-based operations ensure that you'll be up and running in no time.

Get CASH BACK on every 3Com SuperStack 3 Switch 4400 and Switch 4200 you buy...plus the chance to win a classic 1973 Chevrolet Corvette!*

SuperStack 3 Switch 4400 Family



SuperStack 3 Switch 4200 Family




3COM
Possible made practical™



Go to www.3com.com/73corvette/promo14 for your chance to win!

Plus, get \$60 CASH BACK for every Switch 4400 you buy
\$50 CASH BACK for every Switch 4200 you buy
\$150 CASH BACK BONUS when you buy any 3

**HURRY—OFFER ENDS
AUGUST 31, 2003!**

1973
**30 YEARS
of Ethernet**

2003

* Restrictions: Rebate program is open to end user companies in the United States (excluding Puerto Rico) and Canada. It cannot be combined with any other 3Com discount program or promotion. For complete rules visit www.3com.com/73corvette. Ends 8/31/03. Sweepstakes is open to employees of end user companies in the United States (excluding Puerto Rico) and Canada (excluding Quebec). No Purchase Necessary. Purchase Will Not Increase Chances Of Winning. Prize valued at \$20,000 (USD). Odds depend on number of entries. Subject to Official Rules. For rules and entry details visit www.3com.com/73corvette. Ends 11/30/03. Void where prohibited. This promotion may be altered or canceled at any time.

Chevrolet and Corvette are trademarks of GM Corp. Chevrolet is not a sponsor and does not endorse 3Com products. Corvette model depicted may not completely or accurately represent the sweepstakes prize.

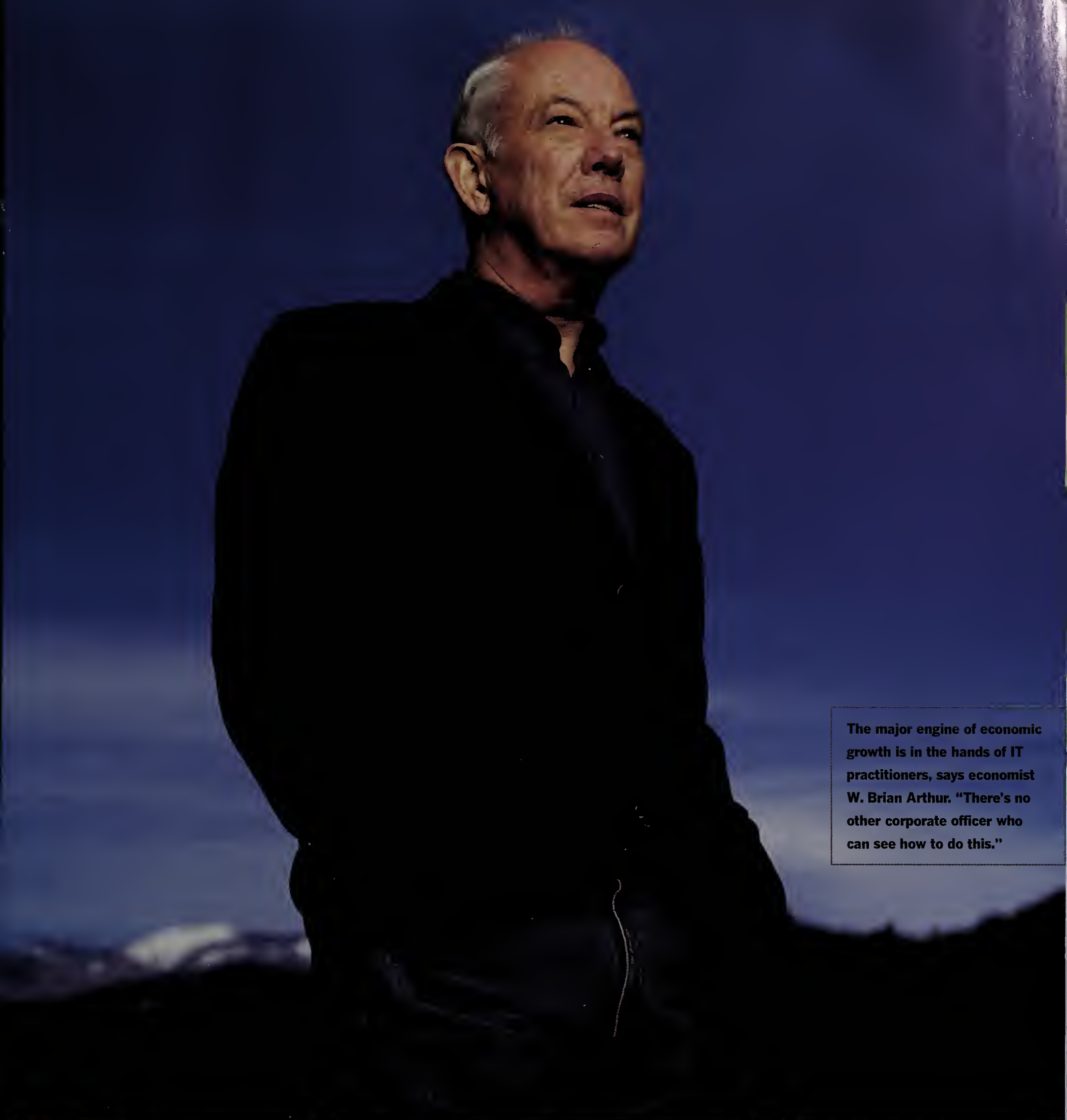
Copyright © 2003 3Com Corporation. All rights reserved. 3Com, the 3Com logo, and SuperStack are registered trademarks and Possible made practical is a trademark of 3Com Corporation. All other company and product names may be trademarks of their respective companies.

Economist W. Brian Arthur says technology will jump-start the economy by connecting systems, processes and functions within and among companies. But it's up to the CIO to channel these connections into new functionality that will transform their industries.

THIS COUNTRY'S ONE AND ONLY ECONOMIC driver for the next several decades rests solely in the hands of CIOs. That's the conclusion of economist W. Brian Arthur, Citibank professor at the Santa Fe Institute, who developed the modern theory of increasing returns. But Arthur isn't talking about CIOs shelling out more cash for additional servers, pumping new revenue into Silicon Valley. It's far more profound than that, he recently explained to *CIO* Deputy Editor Richard Pastore, and a little disconcerting if you happen to be a CIO or someone who takes the *Terminator* movies way too seriously.

Arthur postulates that as industries "encounter" digital technologies, they are being fundamentally and organically transformed. Technology inexorably invades an industry's neurological process, connecting systems, processes and functions within and among companies. The technologies will carry on intelligent, ongoing conversations between

PHOTOGRAPHY BY DOUG HOESCHLER



The major engine of economic growth is in the hands of IT practitioners, says economist W. Brian Arthur. "There's no other corporate officer who can see how to do this."

Reloaded

themselves. The effect will be previously undreamed-of processes and functionality that will alter what companies do, fundamentally transforming their industries. Witness already the transformation of the pharmaceutical industry with the advent of genomics and combinatorial chemistry—breakthroughs that would have been impossible without IT. Arthur, who is speaking at the CIO 100 Symposium next month in Colorado Springs, Colo., says the only corporate leader who can harness and channel this digital transformation is you.

CIO: You've observed that since 1995 or so, the use of technology has undergone a shift from merely automating existing processes to making possible dramatically new functions, thus changing the nature of companies and industries. Can you explain what you mean?

W. Brian Arthur: What's happening with technology is deeper than and different from what happened in the past. As different industries encounter digital technology—which includes telecommunications and satellites—the pattern seems to be that completely new activities spring to life. It's not about speed and productivity enhancements—better, faster, cheaper. There are actual new tasks being accomplished. You couldn't map genes without computers to control the biochemistry, do the algorithms and the sequencing, and that capability has changed the nature of drug development. You can't do DNA fingerprinting without computers, which has transformed criminal investigations. In the financial services industry, you could not do risk engineering and financial derivatives, and now that's a huge market. The rise of smart weapons means we need fewer troops to prosecute warfare. Those industries aren't just applying computers to what they do already; they are making digital technology a component of new functionalities that would be totally impossible otherwise. And these new functionalities are profound enough to transform those industries.

Hasn't this extended bear market put those transformations on hold for most industries?

No, not really. Growth at the moment is indeed on hold. Silicon Valley is getting by, but not doing much better than any other industry. On the other hand, the transformation process I'm describing is inevitable—and it's well under way already in the military, banking, manufacturing and grocery retailing industries.

In what way?

Digital technology is reaching into lots of business and technical processes, and becoming an integral part of them. Businesses and technologies themselves are engaged in ongoing conversations. The Cruise missile is having a conversation with a GPS satellite and with its base aircraft carrier. In other words, digitization is becoming a neurological process in industry itself. And



IT'S GOING TO
be IT people
showing top
management
what is possible.

—W. Brian Arthur



Lotus® software

See better collaboration.

See faster decisions.

See lower costs.

Can you see it?

From the leader in collaboration, a new way to do business that increases responsiveness and simplifies access to people, information and processes. Lotus Workplace delivers wide-scale collaboration for everyone in your workforce. Openly. Flexibly. Affordably. With business results on demand. To learn more about the first Workplace offering, see our demo of Lotus Workplace Messaging™ at ibm.com/lotus/seeworkplace

@business on demand™ software

IBM®

IBM, Lotus, Workplace Messaging, the e-business logo and e-business on demand are registered trademarks or trademarks of International Business Machines Corporation in the United States and/or other countries. Certain information contained within this advertisement is based on WW ICE revenue, July 2002, IDC "WW ICE Forecast and Analysis, 2002-2006." Certain cost information herein based on acquisition cost as compared to premise-based client/server ICE. ©2002 IDC. ©2003 IBM Corporation. All rights reserved.

therefore, when the economy comes back, and even before it comes back, this process will continue apace, and industries will discover new functionalities and transform themselves. It's unstoppable.

Sort of like mutations that inevitably transform or replace an organism's original DNA and lead to evolution.

That's exactly the phrase I would use. As digitization works its way into every process, it is linking all these processes in the manufacturing and service parts of the economy. And intelligent new things are emerging.

Is there a historical precedent for this?

Yes. In the 1880s, railroads were for the first time connecting everything to every-

engine of growth. I don't see the driver coming from anywhere else. I don't see an enormous pent-up consumer demand, or the discovery of a vast new market (with the possible exception of China)—the traditional ways in which an economy would have expanded 150 years ago. I don't see any other source that will provide deep growth for the next several decades.

What are the roles of the CIO and the IS organization in this engine of growth?

In the 1970s, the IT person would have said something like this: "My company is purchasing computers. And I am the guy who knows how to run computers. I will run the computers in the company, design the applications and get them working."

constant contact with Frankfurt or Boise, Idaho." They must imagine how all of this should happen in a reliable and intelligent way, and initiate it themselves.

To make a logical conclusion then, the major engine of growth for the economy will be in the hands of IT practitioners.

Very much so. There's no other corporate officer who can see how to do this. If you're trained as an MBA, or a lawyer or a middle manager, you can't be expected to have the imagination to see what's possible—it's too complex. So I think it's going to be IT people showing top management what is possible.

In the short term, I think CIOs would be frustrated and say, "I'd love to get busy driving the economy. But because the econ-

AS DIGITIZATION WORKS its way into every process, it is linking all these processes in the manufacturing and service parts of the economy. And intelligent new things are emerging. —W. Brian Arthur

thing in the United States. They became the communication network of the day, the neurology of the day. And they were bringing new industries into existence: There wouldn't be a beef industry in Chicago if you couldn't get the cattle from the stockyards there by rail to be slaughtered, and then get the beef to the consumers. Now, the story of our time is the connection of all of these processes and technologies in ongoing conversation.

Assuming that these digital conversations extend externally from organization to organization, then trust and security issues will be major hurdles to progress.

Yes, there is a huge hurdle in terms of trust. Proper security and identification, and encryption and access have to be in place to ensure trust. This will take time.

What effect will industry encounters with technology have on the U.S. economy?

The encounters become the economic

Now the task is very different. Every functionality or process or task in the company is starting to be affected by every other one. So IT people are integrating applications, data, standards. They are supporting multiple platforms—PDAs, wireless devices, laptops. They are worrying about storage and multiple access to storage. All of this activity is about getting people, devices, processes and applications to interact, to talk with each other.

What CIOs need to do is, number one, realize what's going on. Then, they can't just react passively and say, "Yes, the people upstairs have demanded that we be in

omy is not growing, no one is giving me money to drive it."

What I'm hearing from CIOs is, "No, we're not buying new equipment because our budget is limited. What we're trying to do is use the old equipment, and link it together, and get it all to talk to each other." And that doesn't depend on having a huge budget. It depends on taking your IT people and turning them loose to make the existing technology work far better for the company.

It's the IT people, again, who are going to have to do this. So, it's not because nobody is purchasing that IT is down and out and the IT people's day is over. On the contrary, they will be the major force in our economy. **CIO**

Learn More About Arthur

Read **W. BRIAN ARTHUR'S** biography, selected articles and research papers at www.santafe.edu/arthur. For his predictions of the impending IT buildout in "Never Mind the Crash, Here Comes the Buildout," go to **I.T. RELOADED** at www.cio.com/071503.

CIO.COM

Do you agree that IT must be the major engine of economic growth? Write to letters@cio.com. Deputy Editor Richard Pastore can be reached via e-mail at pastore@cio.com.

DB2. Information Management Software

See DB2 software connect data, near and far.
See DB2 software connect formats, old and new.
See DB2 software create insight, again and again.

Can you see it?

DB2. It's the ultimate portfolio of real-time information management software. You can now leverage every scrap of data and content, no matter where it is, or what it is. You see it all, as if it resided in a single place. Insightful and open, DB2 lets you use and build on what you already have, whether it's IBM, Oracle or Microsoft®— goodbye "rip and replace." For a DB2 Software Information Kit, visit **ibm.com/db2/seeit**

@business on demand software

IBM

IBM, DB2, the e-business logo and e-business on demand are registered trademarks or trademarks of International Business Machines Corporation in the United States and/or other countries. Microsoft is a registered trademark of Microsoft Corporation in the United States, other countries, or both. Other company, product and service names may be trademarks or service marks of others. ©2003 IBM Corporation. All rights reserved.

Emerging technology

INNOVATION and PRODUCTS in the VANGUARD

Inside

Under Development

Marvelous
magnets74



CASE STUDY EARLY ADOPTER

Building on Air

Bechtel uses wireless tech to gain a competitive edge

BY MERIDITH LEVINSON

BECHTEL GROUP—the \$11.6 billion, 47,000-employee engineering and construction company best known for building the \$14.7 billion English Channel Tunnel and the \$20 billion Jubail Industrial City in Saudi Arabia, and most recently for receiving a \$34.6 million contract to rebuild Iraq's

war-crippled infrastructure—was experiencing a precipitous decline in new contracts in 2001. The value of new work had plummeted from a high of \$23 billion in 1999 to \$14.5 billion in 2000 and to \$9.3 billion in 2001. The weakening of the U.S. economy and the reputation Bechtel earned in

Edited by Christopher Lindquist. Read his column "Tech Tact: New Tools for New Jobs" every Monday at www.cio.com. Send suggestions for future columns and features to clindquist@cio.com.

Bechtel goes wireless...Superdense drives

Systems and security management a little out of control?



Not with us it isn't.

We see management
a little differently
from the other guys.

At NetIQ, we don't see a problem. Only solutions. Managing your Windows server environment is easier than ever with Microsoft Operations Manager. And, as a key Microsoft partner, NetIQ extends Microsoft Operations Manager to manage and secure your entire enterprise, whether you're driving UNIX, NetWare, Linux, Windows...or all of them. **NetIQ. We're the management people. And nobody does management smarter. Nobody.**



►► CIO eBook! Get your free copy of *From Chaos to Control: The CIO's Executive Guide to Managing and Securing the Enterprise*. www.netiq.com/manageability,


netiq
Work Smarter.

CASE STUDY COMPANY INFO

Bechtel Enterprises

Headquarters San Francisco

Project Wirelessly enable remote sales force, using hardware and software from Good Technology, to access e-mail, scheduling and back-end systems.

Objectives Instantaneous access to Bechtel applications would increase efficiency when closing multimillion-dollar deals. Wireless time sheets also would help the company avoid penalties for late filing.

Technology used Good Technology GoodLink messaging system combined with GoodInfo integration software connected to existing back-end systems. Website: www.good.com.

Project started October 2001

Project completed Almost immediately. The existing back-end applications were already Web-enabled, allowing the Good system to quickly put them to work. Integrating non-Web-enabled applications would take longer, according to Bechtel.

Total cost NA. Good estimates that a rollout of one low-end server and 70 devices can cost roughly \$20,000 plus \$35 per user per month for a basic wireless service package.

Actual ROI None estimated. Bechtel prefers to state the project's success in terms of operational efficiencies and costs savings (roughly \$25,000 per month).

Primary benefits Remote salespeople can now request critical information on the fly through their handhelds, allowing for faster contract creation and speedier answers to customer questions. Employees no longer need a landline to submit time sheets, reducing delays.

Future plans Bechtel is investigating expanding the number of users from 35 to 200. The company is also anticipating Good's move to support its platform on other devices, including Microsoft PocketPC and PalmOS.

Massachusetts over its alleged mismanagement of the \$14 billion-plus Central Artery Tunnel Project (a.k.a. the Big Dig) seemingly had combined to hurt the giant's financial performance.

Looking for a way to increase efficiency—and hopefully improve sales—in October 2001, Bechtel Enterprises, the finance, development and investment wing of Bechtel Group, rolled out a wireless infrastructure and 35 handheld computers from venture-backed startup Good Technology. Alberto Hernandez, Bechtel Enterprises' information systems manager, thought the wireless technology would let

ports) when putting together a business plan for a potential client. The mobile workers can also more quickly find out which prospective customers their colleagues are meeting by wirelessly searching a proprietary market intelligence application called BDTools. In addition, they no longer need to struggle with unstable dial-up connections to submit time sheets.

Jack Gold, an analyst with Meta Group, says ROIs for wireless deployments will vary, but there are "three primary benefits companies should seek." One is increased productivity of users. Another is

The PDAs and wireless infrastructure have certainly made accessing time-sensitive information and mission-critical applications much easier for Bechtel Enterprises' deal makers.

his division's mobile professionals, who are responsible for striking deals with potential customers, close more contracts and thus improve Bechtel's overall financial state. Thirty-five handhelds may seem like small potatoes for such a huge company, but when each person working with one of those wireless PDAs is in charge of inking a multimillion dollar deal, a technology's impact can add up fast.

"In today's market, the person who's got the most information is able to win the most work," Hernandez says. "When you're out there trying to make a deal, there's a lot of info that could give us an advantage over a potential competitor."

The PDAs and wireless infrastructure have certainly made accessing time-sensitive information and mission-critical applications much easier for Bechtel Enterprises' deal makers. They can now much more easily tap in to the company's proprietary personnel database, ExpertLink, to identify individuals with particular expertise (such as fluency in Arabic or experience constructing air-

more efficiently run operations. The final one is "better overall customer intimacy," he says. And according to Hernandez, Bechtel Enterprises has scored two of the three—increased productivity and more efficiently run operations.

No More Waiting

Before Bechtel Enterprises began deploying wireless technology, mobile workers didn't have easy access to corporate information. If, for example, a Bechtel Enterprises employee in Asia was trying to put together a deal with a potential customer in that region to build an airport and wanted to show the client all the expertise the organization had in building airports, he would have to ask an HR person in Bechtel's San Francisco headquarters to search the company's ExpertLink database for a list of qualified individuals. The employee in Asia would have to wait at least a day to get the information because of the time difference and the lack of connectivity. Today, the remote Bechtel rep can get that information instantly on his PDA.



You trust that the ravages of 400 years have not weakened the base.

You trust the granite bases to support the 24-foot high Corinthian columns.

You trust nothing more than eight columns to sustain a 15,000-ton dome above your head.

Shouldn't you feel the same way about your digital infrastructure?

VeriSign® delivers critical infrastructure services that make the Internet and telecommunication networks more intelligent, reliable and secure. Every day VeriSign helps thousands of global businesses and millions of people connect, communicate and transact. While our services are wide ranging, our goal is simple: to make you feel as confident in the digital world as you do in the physical one. To find out more, visit www.verisign.com


The Value of TrustSM

Security Services
Telecommunication Services
Directory Services

Submitting time sheets pertaining to work on U.S. government contracts was also a problem before Hernandez brought in wireless. Government regulations require the company to fill out sheets on a daily basis. Each time an employee fails to submit one on time, whether due to an unstable dial-up connection or the inability to locate a computer with dial-up access, Bechtel incurs a "substantial" penalty. (Hernandez won't elaborate on the actual figure.) These days, Bechtel Enterprises' mobile sales force no longer has to worry about temperamental modems preventing them from submitting their time sheets on time. They can access the time record

didn't have instant access to the information they needed. Syncing the data on a handheld with the data stored in back-end corporate databases required a trip to the user's desktop cradle, which was likely back in a hotel room or the home office. After he was approached by sales executives from Good Technology, Hernandez became sold on the basis of the company's cradleless, wireless synchronization technology, the capability to wirelessly enable proprietary corporate applications so that users could access them from either their RIM or Good devices, and the fact that Good's software will eventually run on other devices, such as Palms, Hand-

with banks or experiences with lenders, GoodInfo connects to the necessary data sources and returns the results to the user via wireless e-mail within minutes.

Hernandez says it took just three hours to get the GoodLink server up and running and about five hours to both put the GoodInfo server online and wirelessly enable three corporate applications—ExpertLink (the resource management application), BDTools (the market intelligence application) and BETR (Bechtel Enterprises' time recording application). (Hernandez admits that the deployment was so quick partly because the applications were already Web-enabled. Had he needed to put a browser-interface on those apps, the implementation would have taken much longer.)

Hernandez won't disclose the cost of the hardware, software and wireless service he purchased from Good, noting only that he spent \$10,000 in consulting fees. But a company that buys low-end server software from Good and rolls out 70 devices can expect to make an initial investment of less than \$20,000 (based on the \$349 cost of each handheld device and the GoodLink server that starts at \$2,000) plus \$35 per user per month for a basic wireless service package and other fees, according to Good.

Hernandez, who is participating in an early-adopters program with Good, is currently in the process of deciding, with users' input, which other corporate applications should next be made available via the wireless network. He wants to roll out more devices to the 250 employees who work for Bechtel Enterprises. In fact, he says, if he gets his way, everyone in the organization will have one.

The Benefits

In 2002, Bechtel Group managed to increase the amount of new business it booked from \$9.3 billion in 2001 to \$12.7 billion in 2002 for a net increase of \$3.4 billion. Hernandez won't credit any of that increase to wireless technology. He will, however, point to cost

In spite of Bechtel's dramatic cost savings, this kind of wireless deployment won't work for every company.

application and submit their time sheets through wireless handhelds.

To access their Microsoft Outlook e-mail, calendar or contact information, employees had to find a location with a computer (if they didn't have one of their own) and either a LAN connection or the capability to access the corporate network via a remote access server (RAS). "You've got a person sitting at a terminal waiting for, one, a connection, and two, for the data to come back to them via an analog line, which is pretty slow," says Hernandez.

While all that waiting seems like it would be enough to make any user scream to their IS department for better IT, Hernandez insists he wasn't getting complaints from users about the difficulty of making those remote connections. "I think we were being proactive," he says.

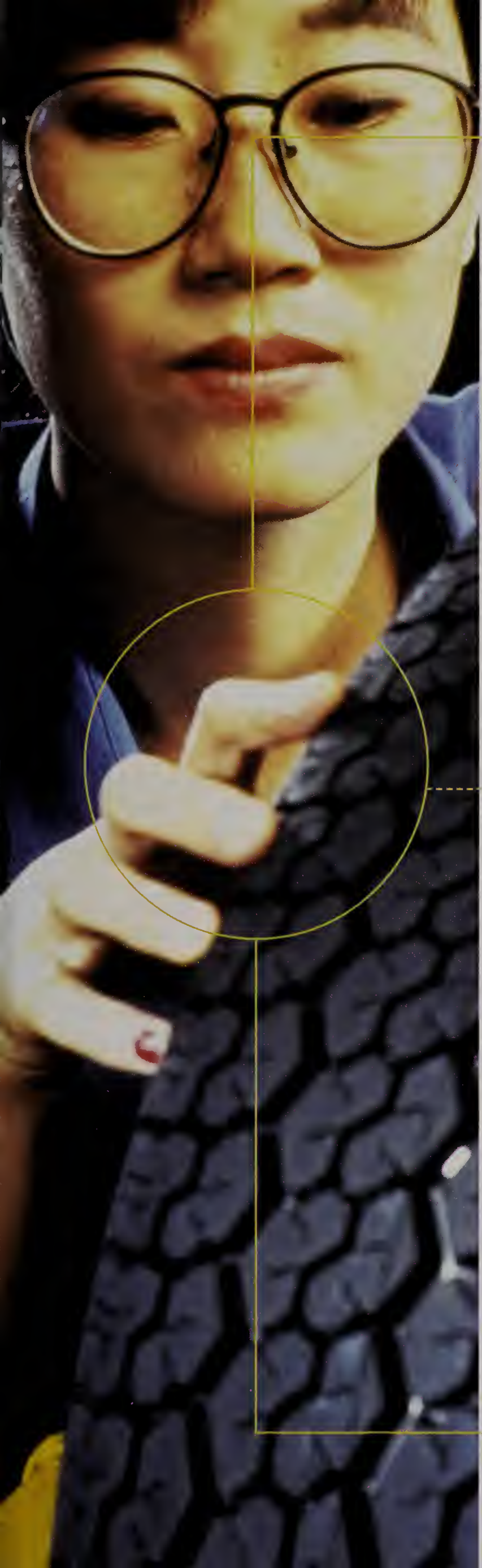
Drop the Cradle

At the time Bechtel Enterprises decided to give wireless a whirl in 2001, 35 of its 250 employees were already using BlackBerry pagers from Research In Motion (RIM). But even with the BlackBerrys, users

springs, Compaq iPAQs and Microsoft smart phones.

In addition to purchasing 35 new Good devices, which brought the total number of wireless handhelds deployed in the organization to 70, Bechtel loaded Good's GoodLink and GoodInfo software onto two different servers. The GoodLink software lets handhelds communicate with the company's Microsoft Exchange server. GoodLink takes all the e-mail, contact and calendar information in Exchange, converts it to a format suitable for a RIM or Good device, encrypts it using Verisign's triple DES (data encryption standard; a popular symmetric-key encryption method) and pushes it outside the Bechtel firewall and over Cingular Wireless's Mobitext network.

Meanwhile, GoodInfo performs database queries on a variety of back-end systems, including proprietary databases, an ERP system, and a Salesforce.com or Siebel CRM system. For example, if a user wants to find out if any of his colleagues are meeting with ExxonMobil or if he needs information on tax policies, contracts



The Goodyear Tire & Rubber Company drives on Enterasys.



And increases productivity at more than twice the industry rate.

When The Goodyear Tire & Rubber Company looked to improve operational efficiency, it called on long-time solutions vendor, Enterasys Networks. The upgraded infrastructure—powered by an intelligent, high-performance backbone—has delivered dramatic increases in bandwidth to support growing user and application demands. At the same time, the enhanced visibility of the network has simplified management, reduced costs and maximized uptime.

The bottom line: Thanks to a *Business-Driven Network* from Enterasys, productivity jumped by 6%, allowing Goodyear to maintain its competitive edge.

For the full story, go to enterasys.com/goodyear

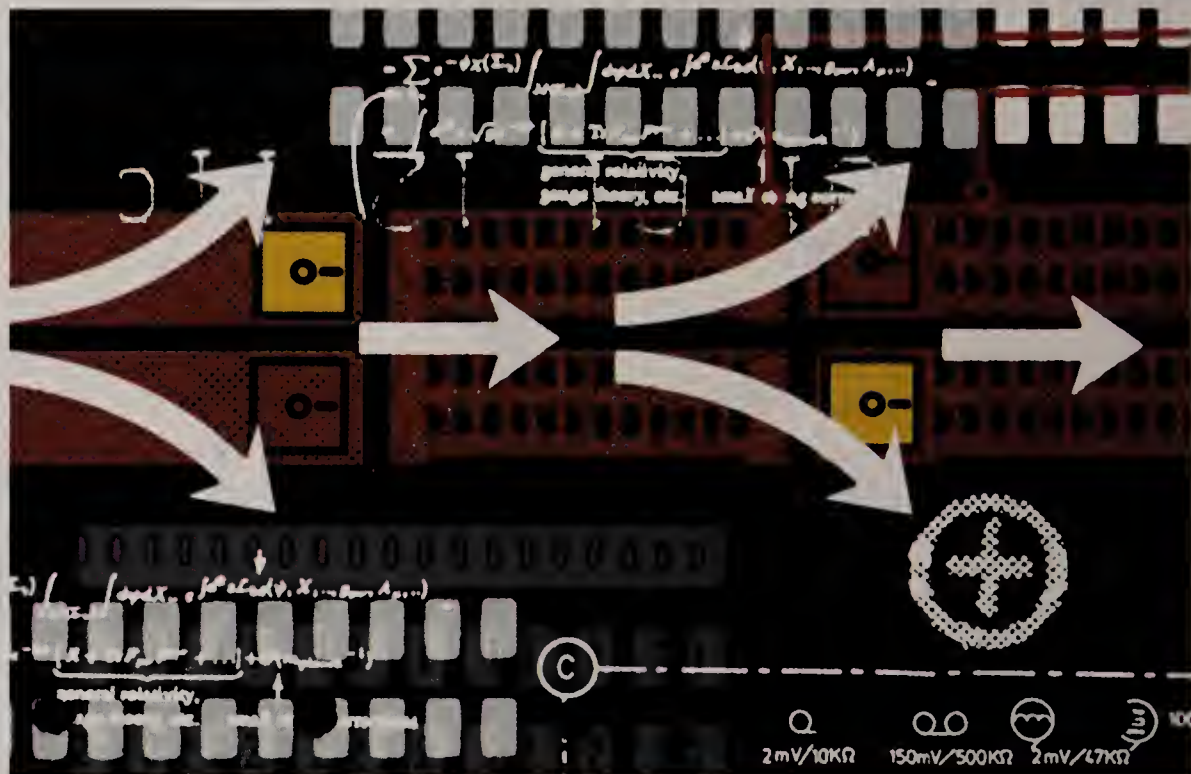
ENTERASYS
NETWORKS™

savings. By deploying Good's technology, Hernandez was able to disconnect the RAS server, saving his company about \$30,000 a month on remote connectivity. He says the difference between what he was paying for the RAS server and what he's paying for Good is about \$25,000 a month.

In spite of Bechtel's dramatic cost savings, this kind of wireless deployment won't work for every company. Stephen Drake, an analyst with research company IDC (a sister company to *CIO's* publisher, CXO Media), advises companies to think critically about which applications they want to make available over a wireless network and who's going to use them. Bechtel Enterprises made three mission-critical applications available to its mobile sales force. Good made sense for Bechtel Enterprises because the organization uses the devices to obtain basic, textual data that's easy to format for a small screen and that doesn't take a long time to download over the slow Mobitext network (which is one-tenth the speed of a phone dial-up connection). If Bechtel Enterprises employees were downloading graphic-intensive maps or diagrams, they'd want to reconsider using both handheld devices and a slow network. And if the organization's users were not salespeople on-the-go but construction workers spending their days underground, they'd probably opt against a pure wireless connection, which would be impossible to access from their subterranean locale, in favor of a cradle solution or some combination of the two.

But for Bechtel's purposes, the Good products have proven...good. "It's critical for our people to be able to access information. We're a global organization. For them to be able to retrieve information without having somebody here in the office get it for them is a big deal for us," says Hernandez. ■

Senior Writer Meridith Levinson can be reached via e-mail at mlevinson@cio.com.



UNDER DEVELOPMENT

Storage

Sensitive Sensors

GET THOSE GIGS. The State University of New York at Buffalo's Mechanical and Aerospace Engineering Department has developed sensors that could boost hard drive capacity by a factor of 1,000—without also driving up price.

As manufacturers develop hard drives designed to cram ever smaller data bits onto disk platters, the bits' magnetic fields get weaker. That makes it increasingly difficult to detect and reliably read data. More sensitive sensors would allow manufacturers to raise hard drive density without worrying about pushing magnetic fields below readable levels. That's where SUNY Buffalo's technology steps in.

Two of the school's researchers have created a nanoscale magnetic sensor that produces, at room temperature, unusually large electrical resistance changes in the presence of tiny magnetic fields. (Resistance change is the phenomenon that allows a hard drive sensor to discern between "on" and "off" bits stored on magnetic media.) Associate professor Harsh Deep Chopra, who created the sensor with professor Susan Hua, predicts that the new technology could allow disk capacities on the order of terabits (trillions of bits) per square inch, instead of today's limit of 10 to 30 gigabits in the same space.

Chopra and Hua created the sensor by forming microscopic nickel "whiskers" between two larger electrodes. The sensors take advantage of an effect known as ballistic magnetoresistance, or BMR. The effect occurs when there's a path that's so narrow that it allows electrons to shoot straight through without scattering. "Using our manufacturing method, we are able to get a change in resistance of up to 100,000 percent," compared with today's technology, says Chopra.

Chopra notes that the sensor's ability to work at room temperature makes it relatively easy to adapt the technology to work with existing hard drive technologies without significantly adding cost. "We could see supercomputer-size capacity in the size of a wrist-watch," he says.

—John Edwards

Congratulations!

You've Picked a Winner!

CIO magazine is the proud recipient of the prestigious 2003 Grand Neal Award—the top editorial honor granted to one publication from more than 1,000 entries across all categories and circulation sizes. **CIO** also won Neal Awards for “Best How To” for the 2002/2003 Year-End Issue and “Best Article” for “Microsoft’s New Subscription Plan: CIOs Just Say No.”

The Neal Award judges aren’t the only ones who prefer **CIO** magazine. CIOs choose **CIO** as the one publication they rely on for insight and strategies for managing IT.*

NOW THAT’S WHAT WE CALL AN AWARD!



Often hailed for its preeminence as the “Pulitzer Prize of the business press,” the Neal Award is the business publishing industry’s annual salute to individual editors for outstanding editorial excellence.

*SOURCE: **CIO** READER PROFILE STUDY, MRI, AUGUST 2002



The Resource
for Information
Executives

CIO 1000 SYMPOSIUM AND AWARDS CEREMONY

Our award-winning CIOs share ideas
you can use today, as they tell us

What Works Now

Some of our favorite thought-leaders
look into the future, and predict

What Lies Ahead

Winning Ideas

Create a Cutting-Edge Culture: Being innovative is more important—and more challenging—than ever. How can you be resourceful and forward-thinking, even in tough times?

Invent New Methods of Showing Value: You're under more pressure to show the value of every IT dollar. If traditional ROI metrics don't work in your case—make up your own. Two of our winners did. **Get Fast and Flexible:** Adapting and moving quickly on opportunities is a trait of truly resourceful organizations. Two winners turned adversity into advantage, developing faster, more flexible processes. **Motivate Employees and Boost Morale:** When the economy enters a downward spiral, so does morale. Our winners share initiatives that help keep their most important resource happy.

August 17-19, 2003 | The Broadmoor | Colorado Springs, CO

To enroll | 800.355.0246 | www.cio.com/conferences

Gather with fellow attendees to discuss common problems and possible solutions.

- Designing for maximum IT cost flexibility/agility
- Compliance and liability: dealing with Sarbanes-Oxley and Patriot Act legislation
- Long-term partnerships: negotiating strong, mutually beneficial vendor deals
- Bleeding-edge tech: lessons from the front lines
- Ensuring data privacy in an access-hungry environment
- The CSO in you: how to be your own security watchdog
- Building the next generation of IT leaders
- Offshore outsourcing
- Navigating the landmines of mergers/acquisitions
- And more!

Your Hot Topics



Solid Peer Advice

Executive Mindshare Sessions

Small working groups of CIOs explore the challenges and best practices of specific, critical IT/business topics.

Networking Opportunities

Make the connections with other CIOs who can help you today and tomorrow: take advantage of our break-fast and lunch roundtables, receptions, and evening dinner and hospitalities.

Presenters

CIO 100 Winners

The best-of-the-best. Select CIO 100 Award Winners share best practices in leadership and resourcefulness.

Paul Saffo

Joins us again as Symposium moderator and talks about why he thinks we're on the verge of an onslaught of technological innovation that will affect every corner of business and society in the decades ahead.

W. Brian Arthur

Citibank Professor of the Santa Fe Institute shares his views on how sub industries such as genomics, proteomics, financial engineering, nanotechnology and the like are being born out of IT.

Howard Rheingold

Futurist and guru of digital culture gives us his observations on the "Smart Mob" phenomenon.

Abbie Lundberg

CIO magazine's Editor in Chief hosts a panel of award-winning CIOs. They'll share how they've anticipated the impact on their organizations of the economic and political events of the past two years and how they lead in an age of extraordinary challenges.

Sponsored by

ACXION
GREAT RELATIONSHIPS™

APC
Legendary Reliability™

bmcsoftware
Assuring Business Availability®


digital

EDS

equant

FUJITSU

hp
invent

netiq
Work Smarter.

redhat.

SAVVIS
THE NETWORK THAT POWERS WALL STREET™

SupportSoft

TIBCO
The Power of Now™

This year's CIO 100 Awards Ceremony is proudly underwritten by

PeopleSoft

Presented by

CIO

The Resource for
Information Executives

Leadership and Innovation for the Resourceful Enterprise



Sales and Services

CIO SALES OFFICES

President Walter Manninen

Publisher Gary J. Beach • 508 935-4202

Executive VP Sales/Custom Publishing
Ellen Romanow • 508 935-4796

East Coast

Senior VP Sales/East

Michael J. Masters • 973 244-4040

Senior Regional Mgr.

Kathy Powers • 973 244-4041

Regional Sales Manager

Ellie Schwab • 973 244-4042

Account Executive

Joan Bonadeo • 973 244-4043

Advertising Sales Associates

Rhonda Goodman • 973 244-4033

Sharon Patrick • 973 244-4044

Fax • 973 227-1565

New England

Senior Regional Manager/Advertising Sales

Len Ganz • 508 935-4039

Senior Advertising Sales Associate

Dawn Cora • 508 935-4092

Fax • 508 879-6063

Mid-Atlantic

Senior Regional Manager/Advertising Sales

Louise Cupelli • 215 627-8117

Account Executive

Maureen Welsh • 215 928-9151

Advertising Sales Associate

Meredith Hagan • 215 627-8114

Fax • 215 627-8224

South Central

Regional Director/Advertising Sales

Robert E. Sawdon • 512 306-9801

Senior Advertising Sales Associate

Brenda Garza • 512 306-9801

Fax • 512 306-9805

North Central

Regional Sales Manager

Christopher Nolan • 847 441-3143

District Sales Manager

Beth DeVillez • 847 441-3140

Advertising Sales Associate

Kim Giovanni • 847 441-5005

Fax • 847 441-5150

West Coast

VP Sales/West

Cheri Parr • 415 975-2685

Senior Regional Manager/Advertising Sales

Jane Evans • 415 975-2680

Regional Manager/Advertising Sales

Ai Collins • 415 975-2686

Account Executives

Derek Jung • 415 975-2683

Tom Ocampo • 415 975-2693

Fax • 415 543-2358

Southern California

Regional Sales Manager

Chris Bramel • 949 475-5579

Account Executive

Issac Ugay • 949 475-5579

Fax • 949 475-5583

LIST SERVICES

List Services Director

Kathryn A.W. Marston • 508 935-4072

List Services Account Executive

Stephanie Roy • 508 935-4151

List Services Coordinator

Kim Cormican • 508 935-4152

ONLINE SERVICES

VP/Online Sales

Lisa Brown • 508 935-4470

Online Sales Manager

Michael McPhee • 508 935-4611

CUSTOM PUBLISHING

Group Director • Michael Siggins

Director • Mary Gregory

Director of Content Development • Tom Field

Project Managers • John Danielowich, Amy Greenleaf

Graphic Designer • Chris Brown

REPRINT SERVICES

For article reprints, please contact

Reprint Services at 651 582-3800 or

e-mail cioreprints@reprintservices.com.

CIO IS PUBLISHED IN THE UNITED STATES AS WELL AS IN:

Australia, CIO Australia www.idg.com.au

Canada, CIO Canada www.lti.on.ca/cio

China, CEO & CIO China www.ceocio.com.cn

France, CIO France www.idg.fr/cio

Germany, CIO Germany www.cio.de

India, CIO India 91-80-521-0309/12

Japan, CIO Japan www.idg.co.jp

New Zealand, CIO New Zealand www.idg.co.nz

Norway, CIO Business Standard

www.business-standard.no

Poland, CXO Poland www.cxo.pl

Singapore, CIO ACEN/Hong-Kong

www.idg.com.sg

South Korea, CIO Korea www.cio.seoul.kr

Sweden, CIO Sweden www.cio.idg.se

For further sales information, visit
www.cio.com/marketing/salesoffices.html.

CIO Contact Information

Editorial, Advertising and Business
Offices: 492 Old Connecticut Path,
P.O. Box 9208, Framingham, MA
01701-9208, 508 872-0080.

CIO (ISSN 0894-9301) is published
semimonthly and as a combined issue
December 15/January 1 by CXO Media
Inc., 492 Old Connecticut Path, P.O.
Box 9208, Framingham, MA 01701-
9208. Periodicals postage paid at
Framingham, MA, and at additional
mailing offices. Canada Publications
Mail Agreement Number 1902075.
CANADIAN POSTMASTER: Please
return undeliverable copy to P.O. Box
1632, Windsor, ON N9A 7C9.

Permissions: Copyright 2003 by
CXO Media Inc. All rights reserved.
Reproduction of material appearing
in CIO is forbidden without written
permission. Send all requests to
Permissions Department, CIO, 492
Old Connecticut Path, P.O. Box 9208,
Framingham, MA 01701-9208.

Photocopy Rights: Permission to
photocopy for internal or personal
use or the internal or personal use of
specific clients is granted by CIO for
users through the Copyright Clear-
ance Center, provided that the base
fee of \$3 per copy of the article, plus
\$.50 per page is paid directly to
Copyright Clearance Center, 27
Congress Street, Salem, MA 01970.
Please specify: ISSN 0894-9301.
Permission to photocopy does not
extend to contributed articles
followed by this symbol: ‡.

Subscriptions: Address inquiries to
CIO, P.O. Box 489, Northbrook, IL
60065-0489; 866 354-1125. CIO is
free to qualified information execu-
tives. To all others the one-year basic
rate is \$150 for the United States and
Canada, \$195 to foreign countries
(payable in U.S. funds only). The
single copy price is \$9. Please allow
four to six weeks for new subscrip-
tions to begin.

Change of Address: Please go to
www.ameda.com/custsrv/cio and
follow the online instructions.

Postmaster: Send change of address
to CIO, P.O. Box 489, Northbrook, IL
60065-9816. Printed in the U.S.A.

Index of Companies and Advertisers

Page numbers refer to the first page of the article(s) in which the company has a
substantial mention. This index is provided as a service to readers. The publisher
does not assume any liability for errors or omissions.

COMPANY INDEX

Accela Inc. 18
Accenture LTD 18
Alcatel 46
AMR Research Inc. 40
Bechtel Enterprises Inc. 68
Bechtel Group Inc. 68
Belvedere International Inc. .. 46
Citibank N.A. 62
Colton Bernard Inc. 40
Del Monte Foods Co. 40
Dell Computer Corp. 34
Do It Best Corp. 18
Gartner Inc. 18
Good Technology Inc. 68
Google Inc. 18
HighRankings.com 18
IBM Corp. 18
IDC 68
Imperial Sugar Co. 46
Innovation Groups, The 18
iProspect.com Inc. 18

J.C. Penney Corp. Inc. 40
KXEN 46
Levi Strauss & Co. 40
Macromedia Inc. 18
Manugistics Group Inc. 40
McKenna Long and Aldridge
LLP 18
Meta Group Inc. 46, 68
Metastorm Inc. 18
Newell Rubbermaid Inc. 40
NPD Group Inc., The 40
Olive Tree Technologies 18
Overture Services Inc. 18
Perot Systems Corp. 40
Pharmatrak Inc. 18
PricewaterhouseCoopers 18
Procter & Gamble Co., The .. 40
Ricochet Networks Inc. 18
SAP AG 40
Scotts Co. 46
SearchEngineWatch.com 18
Stanley Works, The 40
Toyota Motor Sales USA Inc. .. 34

United Technologies Corp. ... 18
Vicor Corp. 46
Wal-Mart Stores Inc. 34, 40
W.E. Aubuchon Inc. 18
Wipro LTD 18
Verizon Communications Inc. . 34
Yahoo Inc. 18

ADVERTISER INDEX

3COM Corp. 61
Acxiom Corp. 23
Amdocs Ltd. 13
Anixter 25
BEA Systems Inc. 2
Berbee Information Networks
Corp. 51
Business Objects 7
Check Point Software 31
Computer Associates Intl.
Inc. C4, 5
CXO Media Inc.
..... 33, 49, 75, 76, 79
Cysive 29

Dell Computer Corp. 38
Enterasys Networks 73
Fujitsu C2
Gateway 57
Hyperion Solutions Corp. 37
IBM Corp. 65, 67
Intel Corp. 48A
Manugistics 32A
MCI 16
Microsoft Corp. C3
NetIQ Corp. 69
Nextel Communications Inc. .. 35
NextiraOne 8
Oracle Corp. 19
PeopleSoft Inc. 21
SkyTel Communications Inc. .. 27
Sony Electronics Inc. 15
VeriSign Inc. 71
Veritas 11

ARE YOU Ready FOR Wireless

YOU NEED TO GET SMART. FAST.

Is your company ready to embrace the advantages associated with wireless communications? How about the security risks? What are the hidden costs you need to be aware of? And how can you clearly measure wireless's value if dollar-based ROI is not the ultimate determinant? Turn to the **CIO FOCUS™** on **APPLIED WIRELESS: MAKING WIRELESS WORK IN BUSINESS**—actionable information created, filtered and packaged by the award-winning editors of *CIO* magazine.

CIO FOCUS™ is delivered right to your desktop giving you immediate access to the information you need. And for your future reference needs, the electronic file is followed by a packaged version, shipped within 72 hours. Available now at an introductory price.

CIO FOCUS™
STRATEGIC GUIDES FOR EXECUTIVE DECISION MAKING

OTHER CIO FOCUS™ TOPICS AVAILABLE:

- ▶ IT Cost Control: Smarter Spending Strategies for Tight Times
- ▶ Fundamentals of Enterprise IT
- ▶ IT Value: Measurement Tools and Techniques That Work
- ▶ Fundamentals of the CIO Role



The Resource
for Information
Executives

FOR EXECUTIVE DECISION-SUPPORT TOOLS, VISIT THE CIO STORE—THE CIO'S KNOWLEDGE MARKETPLACE.
www.TheCIOStore.com

EXECUTIVE

Summaries

July 15, 2003

COVER STORY Levi's Channel Reorganization

By Kim Girard | 40

Levi Strauss CIO David Bergen says his company is caught in the “jaws of death,” with sales at a six-year low and market share eroded some 12 percent. A Levi's turnaround, to a large extent, depends on a deal to start selling jeans through Wal-Mart's 3,200 stores beginning this summer. But Levi's national distribution model and poor on-time product delivery didn't suit this new “mass channel” and Wal-Mart's high standards. To resolve this, Bergen and a cross-functional team of IT, finance and sales employees planned changes to ordering, logistics and data warehouse applications. All Levi's store and supplier invoices had to be changed to track back to four new regional distribution centers. A new sales dashboard for the first time shows Levi's executives how their product is selling on a daily basis. With this information at their fingertips, along with new demand replenishment systems, Levi's has minimized inventory mismanagement, improving product arrival rates from a weak 65 percent to today's 95 percent. But it remains to be seen whether the system changes, the mass-market channel and the tastes of fickle consumers will all line up to revive this 150-year-old pants pioneer.

“Our supply chain could not deliver the services Wal-Mart expected. The changes to support Wal-Mart are extensive.”

—LEVI'S CIO DAVID BERGEN

Demand Forecasting

By Ben Worthen | 46

WHEN IT COMES TO REAL DEMAND FORECASTING, computer software isn't there yet. Existing products simply cannot exercise the kind of rational analysis or judgment at which human beings excel. Regression analysis takes multiple variables and makes inferences about the relationships between them, charting an upward or downward trend based on sales history. But the software cannot predict the future based on past performance and account for major market changes. Smart users of the technology increase its accuracy by feeding it data from individual points of sale—say, an individual store in a chain, rather than from the whole chain in aggregate. These companies also use computer-generated forecasts as a check and balance for human-generated forecasts, or let their human forecasters tweak the computer's forecasts based on their own expertise.

London Traffic Project

By Malcolm Wheatley | 54

IN CENTRAL LONDON, 688 cameras at 203 sites photograph the license plates of the 250,000 cars that enter the antitraffic congestion zone each day. At a data center, Automatic Number Plate Recognition technology then converts the images to license numbers. Drivers belonging to the numbers subsequently get a toll bill that they can pay at retail outlets. Nothing like this had been attempted in a capital city before, so risk mitigation was the project mantra. One of the smartest moves by Transport for London, the U.K. capital's transit authority, was to recognize its own limitations and outsource project management. Rather than the typical big-bang approach, the traffic project was divided into five chunks (with an IT contract value of \$116.2 million) that could be managed separately. Managers vigorously guarded against scope creep and spread deliverables out over a reasonable timescale. They also opted to integrate proven technologies. The effort was completed on time and on budget—and so far has reduced traffic in the city center by 20 percent.

Q&A: Economist W. Brian Arthur

By Richard Pastore | 62

ARTHUR THEORIZES THAT THE MAJOR DRIVER for economic growth in the next decade will be in the hands of corporate CIOs—like it or not. As industries encounter digital technologies, they are being fundamentally and organically transformed, he says. Technology invades an industry's neurological processes, forming connections between systems, processes and functions within and between organizations. Those technologies will carry on intelligent, ongoing conversations among themselves, giving rise to as yet undreamed-of processes and functionality that will fundamentally transform what companies do and how they do it. But if you think this is science fiction, it's not. This transformation is already happening in the military, pharmaceutical companies and elsewhere, and Arthur says it's the only possible major economic driver he can foresee. CIOs are uniquely positioned to direct it. “There's no other corporate officer who can see how to do this—it's too complex,” Arthur says.

Emerging Technology: Bechtel Case Study

By Meridith Levinson | 68

WHEN YOU'RE TRYING TO CLOSE billion-dollar construction deals, there's no such thing as too much information. With that in mind, Bechtel's finance, investment and development branch, Bechtel Enterprises, has implemented a wireless communication system from Good Technology that lets remote workers quickly retrieve the data they need to put together bids and contracts around the globe. The system also lets remote workers easily submit time sheets without needing dial-up lines, helping Bechtel avoid potential penalties. While the company hasn't measured a specific ROI, CIO Alberto Hernandez points to \$25,000 per month in cost savings.

**In the world of IT, there's
always something new.**

And there's nobody better to help navigate technology's latest and greatest than a Microsoft® Gold Certified Partner for Learning Solutions. They're an elite group of enterprise level training partners proven to be the best in the business. With credentials you won't find anywhere else, they provide customized courses based on assessed needs. And because they've done it time and again, you know your staff is in the best hands possible. They stay ahead of technology, so you can stay ahead of everyone else. Find out more by contacting one of these Gold Certified Partners.

**Locate a Microsoft Gold
Certified Partner for Learning
Solutions near you at:**

[http://www.microsoft.com/
training/goldctec](http://www.microsoft.com/training/goldctec)

How IT experts stay that way.



Microsoft®
GOLD CERTIFIED
Partner



Does your software let you access the most current financial information?
Ours does.

When you need critical information, you need it now. That's why more and more financial organizations are turning to CleverPath™, Computer Associates' information management solutions. CleverPath lets you find data immediately, not eventually. And it provides you with analysis tools to help predict the best course of action for the future. Best of all, CleverPath solutions can be up and running in weeks, not months. To find out more, contact us today.

ca.com/cleverpath1

CleverPath™ Information Management Solutions



Computer Associates®